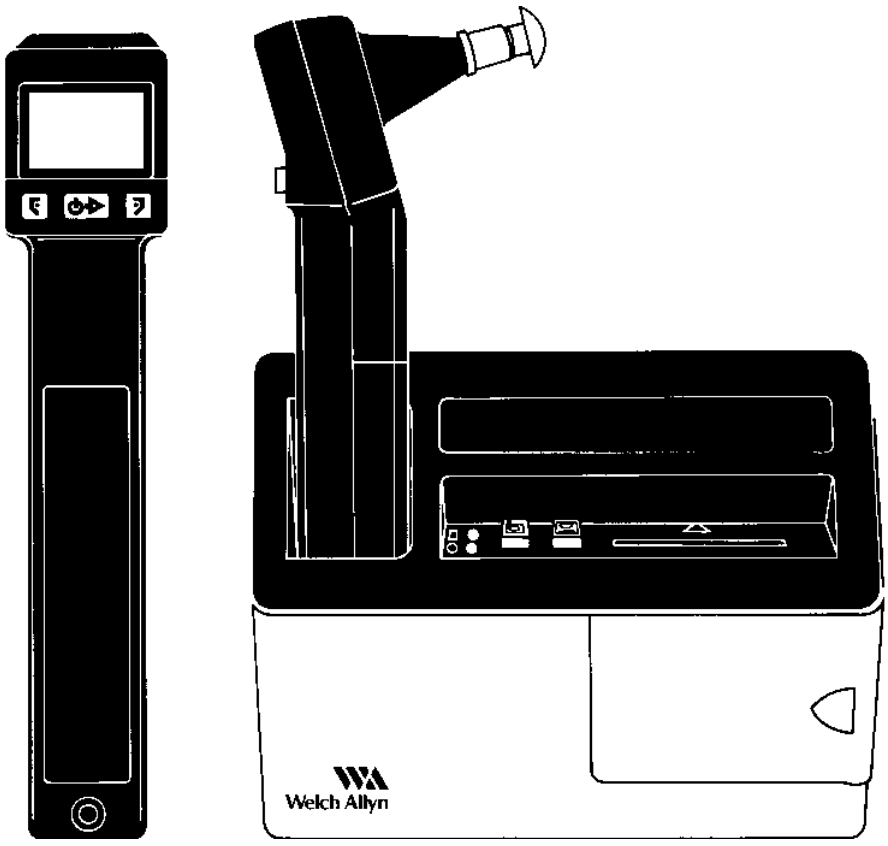
SERVICE MANUAL



Micro Tymp
Tympanometric System

23600 handle, 71130 printer charger

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Welch Allyn Co.

4341 State Street Road
P.O. Box 220
Skaneateles Falls, NY 13153-0220
originator: RJS
ECN#5-30727

Welch Allyn

Service manual pn236261 Rev.D 6/95

Micro Tymp 1 Service Manual

Table of Contents

	Sect.	pg
SECTION 1: General Information		
To Service Personnel	1.1	3
Limited Warranty	1.2	4
Basic System Description	1.3	5
Basic System Operation (Fig.1)	1.4	6
Block Diagram of MT 1 Program	1.5	7
Specifications	1.6	8
SECTION 2: Service		
Repair Methodology & Service Parts	2.1	9
Required Tools and Materials	2.2	10
Training and Manual Components	2.3	11
Calibration Procedure	2.4	12
High Altitude Modification	2.5	20
SECTION 3: Problem Solving		
Troubleshooting	3.1	21
SECTION 4: Disassembly and Repair		
Handle disassembly	4.1	42
Handle re-assembly	4.2	46
SECTION 5: Maintenance		
Printer charger disassembly	5.1	53
Printer charger re-assembly	5.2	55
SECTION 6: Drawings		
Procedure for Calibrator testing	6.1	56
Drawings & listings	6.2	57

CAUTION: USE GROUNDING MAT AND GROUNDING STRAP WHEN SERVICING STATIC SENSITIVE ELECTRONIC COMPONENTS. (6 CMOS IN HANDLE AND 1 CMOS IN PRINTER CHARGER)

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P.O. Box 220
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Service manual pn236261 Rev.D 6/95

Section 1.1 General Information

To Service Personnel:

Read and understand the MicroTymp 1 Operating Instructions manual PN.236084-2. The information in the Operating Instructions and Service Manual are subject to change without notice and should not be construed as a commitment by Welch Allyn, Inc. Welch Allyn assumes no responsibility for any errors that may appear in this manual. If the product and/or its operation varies significantly from any description herein, please contact: Welch Allyn Medical Products Division Technical Service Department, 4341 State Street Road, Skaneateles Falls, New York, 13153-0220, U.S.A., (315) 685-4445, or (800) 669-9771.

This product has been designed to provide a high degree of safety and reliability. However, we can not guarantee against the deterioration of components due to aging and normal wear. All service and repairs must be performed by authorized Welch Allyn personnel or agents, using approved Welch Allyn replacement parts and approved process materials. Failure to do so will invalidate the product warranty. Please refer to the product warranty for specific coverage.

READ AND UNDERSTAND customer comments and complaints on accompanying documentation (P.O. or other correspondence).
If an injury, illness to patient or user, or hazardous malfunction has occurred or is suspected, PROCEED NO FURTHER! **DO NOT** disassemble, repair, adjust, or in any way alter the MicroTymp or the printer charger base... instead, notify your supervisor at once. Give them all accompanying paperwork and any information you might have on the return. They will take appropriate action according to Welch Allyn policy. Check customer service records to determine if this MicroTymp requires or has received any applicable retrofit modifications, improvements, or inspections, and perform these if required.

INSPECT AND TEST it before and after it is repaired. Documentation should include: general condition, defects, missing components and labels, electrical, functional and mechanical problems. Operate the returned instrument to try to duplicate the customer's complaint before and after it is repaired.

Welch Allyn, Inc.
Medical Products Division
4341 State Street Road
Skaneateles Falls, New York 13153-0220
USA
1 800 669-9771
(315) 685-4445

Section 1.2 General Information

Limited Warranty

Welch Allyn warrants the MicroTymp and Printer/Charger, when new, to be free of defects in material and workmanship and to perform in accordance with manufacturer's specifications for a period of one year from the date of purchase from Welch Allyn or its authorized MicroTymp distributors or agents. Welch Allyn will either repair, replace or recalibrate any components found to be defective or at variance from the manufacturer's specifications within this time at no cost to the customer, except for transportation expenses. For rechargeable batteries, warranty is extended to two years. It shall be the purchaser's responsibility to return the instrument directly to Welch Allyn or to an authorized MicroTymp distributor, agent or service representative.
This warranty does not include breakage or failure due to tampering, misuse, neglect, accidents, modification or shipping. This warranty is also void if the instrument is not used in accordance with the manufacturer's recommendations or if repaired by other than a Welch Allyn or authorized agent. The warranty on the MicroTymp can be extended to a three year period provided the instrument is returned for recalibration annually. Purchase date determines warranty and recalibration requirements. No other express warranty is given. Submission of instrument registration card is required for warranty validation.

To receive service assistance or to ask questions regarding this warranty, please call or write:

Welch Allyn Technical Services Dept.
Welch Allyn, Inc.
Medical Products Division
4341 State Street Road
Skaneateles Falls, New York 13153 USA
1 (800) 669-9771 or (315) 685-4445

Section 1.3 General Information

Introduction

The Welch Allyn Micro Tymp Tympanometric System enables the practitioner to perform an objective test of the middle ear function. It provides fast and painless measurement on prevalent disease. Results appear instantly on the liquid crystal display and can be stored and printed in the Printer/Charger.

Basic System Description

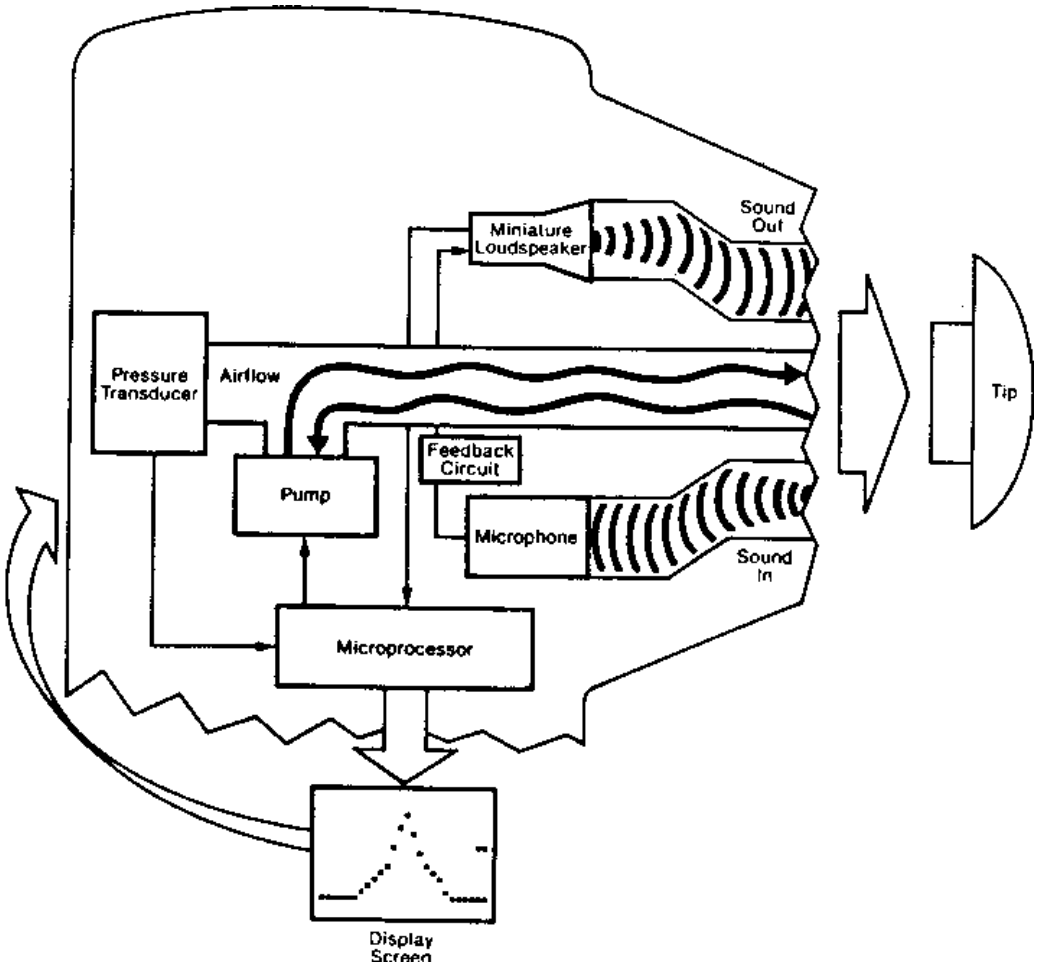
There are two major components to the Micro Tymp Tympanometric System: the hand held Micro Tymp handle, and the Printer/Charger. The handle utilizes a probe with three portholes: one which leads to a pump and pressure transducer for air pressure, one for delivering sound from a speaker, and one which leads to a microphone for picking up the sound. These are clearly shown in Figure 1-1 block diagram.

* A 226 Hz probe tone is introduced in the sealed ear canal by a miniature loudspeaker.
* A microphone records and monitors the sound pressure produced in the ear canal.
* The sound level is maintained at a constant 85 dB SPL (SOUND PRESSURE LEVEL) throughout a test. Therefore, when the amount of sound absorbed by the middle ear increases, the speaker must be driven harder to maintain the correct SPL.
* Pressure in the ear canal is changed with a miniature pump. The pressure transducer monitors this pressure and sends this information to the microprocessor so that it can control the pump.
* The voltage to the speaker determines its output. Therefore, acoustic admittance is proportional to speaker voltage.
* As pressure in the ear canal is changed throughout a test, the microprocessor computes acoustic admittance and plots it out.

The Printer Charger stand contains the print head, power supply PCB, fuses, switch assembly, and microcomputer.

Section 1.4 General Information

FIGURE 1-1...BLOCK DIAGRAM OF WELCH ALLYN MICRO TYMP.

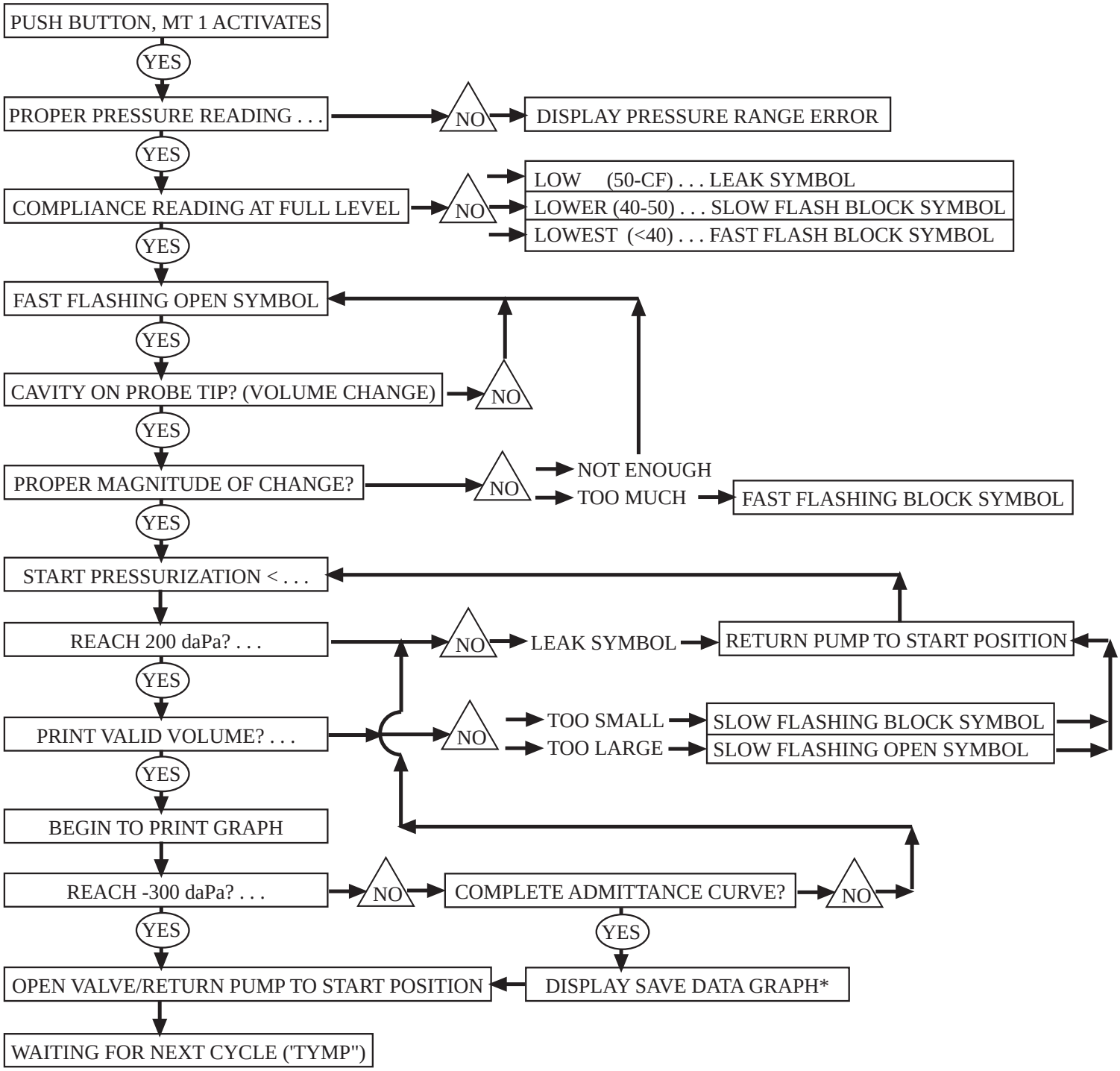


Operation

1. Insert the Micro Tymp handle into the patient's ear.
   Press the tip firmly against the ear canal opening to insure seal.
2. Push **START/RUN** button. Micro Tymp automatically measures and displays results on the LCD. Push memory button (Ear symbol) and repeat for other ear.
3. Return instrument to the Printer/Charger. Push **PRINT** button for double-ear print out. Data transfers immediately and prints out for single or multiple copies. (REFER TO OWNER'S GUIDE).

Section 1.5 General Information

MICRO TYMP 1 OPERATING PROGRAM



*GRAPH DOES NOT HAVE TO HIT THE BASELINE. HOWEVER, IT MUST COMPLETE THE ADMITTANCE CURVE.

Section 1.6 General Information

Specifications

The specifications for the Welch Allyn Micro Tymp are as follows:

Printer Charger base Power requirements:

Model#:	Input-volts/amps	voltage range
71130	120/.1	110-130
71132	230/.06	210-250
71133	100/.11	90-110
71134	230/.06	210-250
71136	230/.06	210-250

Probe tone:

Frequency	226 Hz
Amplitude	85 dB +-3 dB re 20 uPa in an ANSI HA-1 (2cc) coupler.

Admittance Range:

0.2 to 4.0 mmho total
0 to 1.5 mmho for Ya
0.2 to 2.0 cc for +200 Vea

Display Resolution:

0.1 mmho for Ya
0.2 cc for +200 Vea
20 dapa for pressure

Pressure Range:

+200 to -300 daPa

Accuracy:

+- 15% or 10 daPa, whichever is greater.

Compensation:

Auto-Zero with each test cycle.

Pump:

Direction of sweep: positive to negative
Speed: 200 +/-20 daPa/second during acquisition.

Section 2.1 Service

Repair Methodology:

This manual provides technical assistance to Welch Allyn Inc. authorized service representatives for diagnosing, repairing, and testing the Micro Tymp handle and printer charger base and replacing parts as listed below. The manual covers: fault/cause analysis tables, step by step disassembly / reassembly procedures, repair, adjustment, and re-test procedures.

Order Service Parts from a current Welch Allyn Bill of Materials/Repair:

This list provides an overview of available service parts:

pressure transducer assembly	door
battery compartment assembly	printer bottom housing assy
front housing assembly	back housing
piston/diaphragm assembly	flex circuit-overall
electrolytic capacitor	rechargeable battery 7.2v
reference label	fiber strip
phps screw 4-40x.312"&.750"	.5cc check well
#6x3/4"phps hd self-tap screw	right angle header
paper spindle	LB 1256 head driver
power cord assy	releasable cable tie
printer and power supp. PCB assy.	paper installation label
base plate assy	fuse 125ma slo-blo
top housing assy	printer
printer head	platen bar
reset controller	cord guard
self tapping screw. 37	op trans.amp ca3080
1/8 w 5% 62k resistor	battery cover assy
pump assy	voltage invertor ic
1206 chip capacitor	2-56x.56" bdg hd mach sc
IC - signal processor H12340	microprocessor
IC - LCD driver	32k Hz crystal
5v regulator	overcurrent protector
analog/digital converter	logo label
trim resistor 1/4 r 10k	trim resistor 1/4 r 500
trim resistor 1/4 r 5k	trimmer resistor 1/4rnd 50k
trim resistor 1/4 r 200k	2.56 php fl hd mach.sc.
0805 chip resistor 62k	dual power op-amp
multi-turn trim resist.	so transistor 2N3904
so transistor 2N39906	so transistor 2N4403
battery contact	insulator
battery contact r.h.	op amp dual bi-fet tlc272CP
battery contact l.h.	speaker boot assy.
microphone boot assy.	zebra strip
connector	phps screw

MICROTYMP I PARTS

PART #	DESCRIPTION
106100-1	phps screw
106100-11	phps 4-40 x .312
106100-16	phps 4-40 x .750
200055-502	lens holder assy
230035-1	miniature transducer
230047	op trans amp ca 3080
230073-504	hsg assy
230080-502	cover assy
230132-3	1/8W 5%resistor 62K
230201-501	electronics module assy
236001-501	back housing
236003-1	reference label
236006-2	#2 pan head screw
236012-1	bottom contact
236013-501	power jack holder
236020-501	battery cover assy
236037-1	lcd label
236038	lcd retainer
236039-2	lcd frame
236051	#2 flathead screw
236052-501	pump assy
236054	voltage inverter IC
236056-1	1206 chip capacitor
236056-3	1206 chip capacitor
236056-4	1206 chip capacitor
236057	TO -92 voltage regulator
236058	2-56 x .56bdg hd mach screw
236068	microprocessor
236060-2	zebra strip
236063-3	optical interrupter
236069-2	cust IC sig proc HI 2340
236070	LCD driver IC
236071	32 KHZ crystal
236072	5V regulator
236074	overcurrent protector
236075	A/D converter
236078-1	trim resistor (1/4 round)
236078-2	trim resistor 1/4 rnd 500K
236078-3	trim resistor 1/4 rnd 10K
236078-4	trim resistor 1/4 rnd 5K
236078-5	trim resistor 1/4 rnd 50K
236078-6	trim resistor 1/4 rnd 200K
236080	logo label

MICROTYMP I PARTS (CON'T)

236081	#2-56 php fl hd mach screw
236082-15	0805 chip resistor 62K
236083	dual power op-amp
236088-1	multiturn trimmer resistor
236088-2	multiturn trimmer resistor
236089	shoulder screw
236094	SO transistor (2N3904)
236095	SO transistor (2N3906)
236096	SO transistor (2N4403)
236130	top cap pad
236132	lower side pump pad
236133	lcd assembly retaining ring
236136-501	motor/pulley assy (MTI)
236152	O ring drive belt
236167	battery contact
236169	insulator
236171-5	valve
236222	op amp dual bifet TLC 272CP
236239-501	.5cc check well
236240-501	1.9cc check well
236241	battery contact RH
236242	battery contact LH
236244	speaker boot assy
236245	microphone boot assy
236246	pressure transducer assy
236247	battery compartment assy
236248	front hsg assy
236254	connector
236259	fiber strip
236260-501	piston/diaphragm assy
236262	flex circuit overall
236302-501	battery cover assy
440009-1	power cord
483344	releasable type cable tie
710205	power jack
711413	holder f/handle & specula
711418-501	base plate assy
711419-501	set of four rubber feet
711420	#6 x3/4phps hd screw self tpg
711420-1	self tapping screw .50
711421	mtg hardware kit
711427-501	housing assy
711507	door
711510-501	printer bottom housing
711521	right angle header
711524-1	paper spindle
711539	LB 1256 head driver

711542	printer
711545	paper installation label
711561-501	base plate assy
711571-1	fuse 125ma slo-blo
711603-504	printer & power supply pcb
711605-501	top housing assy
711607	printer head
711608	platen bar
711610	reset controller
747227	cord guard
785012-1	self tapping screw .37
711535-5	electrolytic capacitor

72700	7.2 V rechargeable battery

Section 2.2 Service

Required Tools and Fixtures for Service

Specialized test equipment and standard tools are required for diagnosis, calibration, assembly, and board level repairs.

COMMERCIALLY AVAILABLE EQUIPMENT/TOOLS	QUANTITY REQUIRED:
BRUEL & KJAER MODEL 2231X SOUND METER	(1)
B&K 1625 1/3 - 1 OCTAVE FILTER SET	(1)
B&K ZC0020 INPUT STAGE TO BK2231	(1)
B&K A00027 EXTENSION CABLE	(1)
B&K Z19100/WH2014 INTERFACE MOD. 25 PIN	(1)
B&K 4144 1" MICROPHONE	(1)
B&K POWER SUPPLY FOR ABOVE	(1)
B&K DB0375 1" MICROPHONE ADAPTOR	(1)
DVOM (BECKMAN310/4410 OR EQUIV.)	(1)
OSCILLOSCOPE (STORAGE)	(1)
ELECTRONIC SOLDERING STATION	(1)
ELECTRONICS AND JEWELERS SCREWDRIVER SET	(1)
LEAD STRAIGHTENING PLIERS (UTICA#U508)	(1)
SCREWDRIVER (#1 PHILLIPS#2501)	(1)
SCREWDRIVER (#2 PHILLIPS#2502)	(1)
SCREWDRIVER (7/32"Flat Blade,PH#143-36)	(1)
WIRE CUTTER (Xcelite 107CG)	(1)
WIRE STRIPPER (Xcelite 105SCG)	(1)
LONG NOSE PLIERS (XCELITE 51CG)	(1)
HEMOSTATS	(2)
GROUND MAT	(1)
GROUNDING STRAP FOR TECHNICIAN	(1)
TWEEZERS (STRAIGHT)	(1)
SMALL DRILL BIT SET	(1)
COTTON TIPPED SWABS (LINT FREE)	(1)

WELCH ALLYN CUSTOM TOOLS AND MATERIALS:	QUANTITY REQUIRED:
T-3281 TYMP CALIBRATOR (includes dual power supply and leads)	(1)
T-5657 PRESSURE APPLICATOR BOX	(1)
T-5609 TYMP HOLDING FIXTURE	(1)
T-5744 FIXED CAVITY 5 piece set includes:.2 cc, .5 cc, 1 cc, 2 cc, 3 cc	(1)
T-3382 HA-1 ADAPTOR BRASS	(1)
T-5734 DIAPHRAGM PLACEMENT TOOL (TUCKER)	(1)
M-31446 ROSIN CORE SOLDER(.020")63SN/37PB	(1)
M-30313 G.E.RTV108 CLEAR Thick	(1)
M-30327 G.E.RTV118 CLEAR Surface Leveling	(1)
M-13069 RED GLYPTOL VARNISH	(1)
M-30342 LOCKTITE ACCELERATOR	(1)
M-30341 LOCKTITE BLACK MAX ADHESIVE	(1)

*CAUTION WHEN USING ADHESIVES

Section 2.3 Service

Training

When reading this manual for the first time, have a Micro Tymp 1 and Printer/Charger base available for reference and practice. But first, read each complete repair step on what to do and how to do it before starting the repair or practice.

Micro Tymp Service Training should consist of detailed demonstrations of required repair tasks, such as opening up the cases and calibrating. Practice on scopes using actual repair fixtures, tools and materials. Assess skill development by observing trainee practice on actual equipment. Set up sessions to allow the trainee time to individually practice all Micro Tymp repair procedures. The ability of the technician to develop and retain new skills is in great part dependent on well prepared training exercises. Each trainee must have the opportunity to practice the procedure(s) after it has been demonstrated by the instructor.

More detailed background product information is found in the APPENDIX section and as such will be a critical element in a comprehensive service training program for technicians.

Welch Allyn part numbers (PN#), and material numbers (M#), appearing in this manual are current at the date of publication. Order replacement parts by referencing your latest bill of materials, parts catalog and assembly drawings. Part number changes, product updates, or new test procedures should be noted on the appropriate page of this manual by the manual owner. Notices announcing these changes should be attached to the manual.

CAUTION: PRIOR TO DOING REPAIR WORK, UNPLUG POWER CORD, USE GROUNDING MAT AND GROUNDING STRAP TO MINIMIZE SHOCK HAZARD, AND REDUCE CHANCES OF DAMAGE TO SENSITIVE ELECTRONIC COMPONENTS. (6 CMOS IN HANDLE AND 1 CMOS IN PRINTER CHARGER)

Service Manual Components

This manual pn235261 consists of the following components:
236253 Service Manual Text
Assembly Drawings: 236000...011...116...219...220...250
A-Specs: A00848...849, A01745, A01785, A01862

Section 2.4 Service MT 1 CALIBRATION PROCEDURE

Note: After the first six months of production, the circuit board was improved to the PCB+ circuit board. This document, however, will explain how to calibrate both the Original PCB and the PCB+. Tell them apart by these differences: Original PCB has Black and Red calibration wires, blue/white switch PCB+ has a test pin by R24, and none of the above.

Step 1
USE ESD GROUNDING STRAP AND MAT TO PREVENT DAMAGE TO SENSITIVE COMPONENTS:
REMOVE BATTERY COVER RETAINING SCREW AND REMOVE TWO SCREWS LOCATED UNDER THE LABEL. BREAK THE ADHESIVE JOINTS. DO NOT PULL THE HOUSINGS COMPLETELY APART SINCE THE FLEX CIRCUIT AND THE HOSE ARE JOINED AT BOTH HOUSINGS.
PLACE THE MICRO TYMP 1 HANDLE INTO FIXTURE T-5609.

Step 2
PERFORM CURRENT DRAIN TESTS: (taken from A01785 Note #8)
64mA MAX CURRENT DRAIN AT +7.2 VOLT SUPPLY IN FAST BLINKING OPEN MODE, UP TO 200mA MAX WITH PUMP MOTOR AND VENT VALVE ACTUATED.

Step 3
PERFORM FAST CLOCK TESTS:

FOR ORIGINAL PCB, DO THIS:
FAST CLOCK SHALL BE BETWEEN
412-456 (HEX), IF NOT ADJUST C3
(taken from A-00841,Lev.3,Item 4)
(use a trimmer adjustment tool
such as Spectrol 8T000 for C3.)

FOR PCB+ BOARD, DO THIS:
FAST CLOCK SHALL BE BETWEEN
412-456 (HEX), IF NOT ADJUST R22
(taken from A-01777,Lev.3,Item 5)
(ignore acceptance criterion on spec.
it was developed for manufacturing)

Step 4 (this step has four parts)
PERFORM PROBE TONE LEVEL TEST (sound level):

FOR ORIGINAL PCB, DO THIS:
Open Sw 1 and apply *+3.0 VDC*
to TP 2 (Red Wire).
(taken from A-00848 Note #4)

1.
If Probe Tone level **IS 85 +/-2 dB,**
TURN PAGE, **AND DO** Orig.PCB Compliance
DO Step 5 on page 15.

2.
If Probe Tone level **IS NOT 85 +/-2dB,**
adjust R24 to this value.

3.
NOW GO TO TOP OF PAGE 15 and do
Orig. PCB Distortion Test.

4.
NOW GO BACK UP TO PART 1 OF THIS STEP.
Reconfirm adjustments made.

FOR PCB+ BOARD, DO THIS:
Apply *+2.5 VDC* to TP2
(taken from A-01785 Note #4)

1.
If Probe Tone Level **IS 84 +/-2 dB,**
GO TO PAGE 14. DO PCB+ Compliance Test. Test. Then
then **DO** Step 5 on pg 15.

2.
If PCB+ Probe Tone **IS NOT 84 +/-2dB,**
then adjust R24 to this value.

3.
NOW GO TO MIDDLE OF PAGE 15 and do
PCB+ Distortion Test.

4.
NOW GO BACK UP TO PART 1 OF THIS STEP.
Reconfirm adjustments made.

Section 2.4 Service MT 1 CALIBRATION PROCEDURE

Step 4 CONTINUED....

ORIGINAL PCB COMPLIANCE TEST:

(taken from A-00848 SHEET 1 OF 2, ITEM #6,TABLE 1 AND 2.)

(3 VDC STILL CONNECTED) WITH SWITCH 1 OPEN, AND COUPLED TO A 2cc CAVITY, TEST POINT 3 (BLACK WIRE) SHALL BE SET TO 3.0 VDC +/- .05 BY ADJUSTING R33. SWITCH 1 IS THEN CLOSED AND THE 3VDC IS DISCONNECTED FROM TP2. OPEN AND CLOSE SWITCH 1 TEN TIMES AND RE-CHECK THE 3V LEVEL AT TP3.

A. USING A 1cc CAVITY ADJUST R70 PER TABLE 1

B. USING A 3cc CAVITY ADJUST R69 PER TABLE 1

C. REPEAT STEPS A AND B UNTIL ACCURATE READINGS ARE OBTAINED

D. USING A 2cc CAVITY COMPLIANCE SHALL BE WITHIN LIMITS AS PER TABLE 2

E. USING A .2cc CAVITY COMPLIANCE SHALL BE WITHIN LIMITS AS PER TABLE 2

ORIGINAL PCB ONLY

BAROMETRIC PRESSURE / COMPLIANCE CALIBRATION POINT

RANGE (Mbar)	3 CC	1 CC
947 - 952	.C5 - C6	73 - 74
953 - 959	C4 - C5	72 - 73
960 - 968	C3 - C4	72 - 73
969 - 975	C2 - C3	72 - 73
976 - 983	C1 - C2	71 - 72
984 - 993	C0 - C1	71 - 72
994 -1000	BF - C0	71 - 72
1001 -1008	BE - BF	70 - 71
1009 -1017	BD - BE	70 - 71
1018 -1025	BC - BD	70 - 71
1026 -1031	BB - BC	6F - 70

ORIGINAL PCB ONLY

TABLE 1 Calibration Points (from A-00848)

ORIGINAL PCB ONLY

BAROMETRIC PRESSURE COMPLIANCE CALIBRATION POINTS

RANGE (Mbar)	3 CC	2 CC	1 CC	.2 CC
947 - 952	C4 - CC	9B - 9F	70 - 76	4A - 52
953 - 959	C3 - CB	9A - 9F	6F - 75	49 - 51
960 - 968	C2 - CA	99 - 9E	6F - 75	49 - 51
969 - 975	C1 - C9	98 - 9D	6F - 75	49 - 51
976 - 983	C0 - C8	98 - 9D	6E - 74	49 - 51
984 - 993	BF - C7	97 - 9C	6E - 74	49 - 51
994 -1000	BE - C6	96 - 9B	6E - 74	49 - 51
1001 -1008	BD - C5	96 - 9B	6D - 73	49 - 51
1009 -1017	BC - C4	95 - 9A	.6D - 73	49 - 51
1018 -1020	BB - C3	95 - 9A	6D - 73	49 - 51
1021 -1025	BB - C3	94 - 99	6D - 73	49 - 51
1026 -1031	BA - C2	94 - 99	6C - 72	49 - 51

ORIGINAL PCB ONLY

TABLE 2 Calibration Points (from A-00848 sheet 1 of 2)

GO TO STEP 5

Section 2.4 Service MT 1 CALIBRATION PROCEDURE

Step 4 CONTINUED....

PCB+ COMPLIANCE TEST:

(taken from A-01785, Note 6 referring to Tables 1 and 2 of Fig.2)

COUPLE A 2cc CAVITY WITH NO CONNECTION TO TEST POINT 2. THE OUTPUT AT TEST POINT TP-2 SHALL BE 2.50 VDC +/- .05 VDC, IF NOT ADJUST R33.

A. USING A 3cc CAVITY ADJUST R69 AS PER TABLE 1 BELOW.
B. USING A .5cc CAVITY ADJUST R70 AS PER TABLE 1 BELOW.
C. REPEAT A AND B UNTIL READINGS ARE CORRECT.
D. USING A 2cc CAVITY COMPLIANCE SHALL BE WITHIN LIMITS PER TABLE 2 BELOW.
E. USING A 1.0cc CAVITY COMPLIANCE SHALL BE WITHIN LIMITS PER TABLE 2 BELOW.
F. USING A .2cc CAVITY COMPLIANCE SHALL BE WITHIN LIMITS PER TABLE 2 BELOW.

PCB+ ONLY

BAROMETRIC PRESSURE / COMPLIANCE CALIBRATION POINT

RANGE (Mbar)	3 CC	.5 CC
947 - 952	C8 - C9	5D - 5E
953 - 959	C7 - C8	5D - 5E
960 - 968	C6 - C7	5C - 5D
969 - 975	C5 - C6	5C - 5D
976 - 983	C4 - C5	5C - 5D
984 - 993	C3 - C4	5C - 5D
994 -1000	C2 - C3	5C - 5D
1001 -1008	C1 - C2	5C - 5D
1009 -1017	C0 - C1	5C - 5D
1018 -1020	BF - C0	5C - 5D
1021 -1025	BF - C0	5C - 5D
1026 -1031	BE - BF	5C - 5D

'PCB+' ONLY

TABLE 1 "**PCB+** NOMINAL SET POINTS"(from A-01785, Fig. 2)

'PCB+' ONLY

BAROMETRIC PRESSURE COMPLIANCE CALIBRATION POINTS

RANGE (Mbar)	3 CC	2 CC	1 CC	.5 CC	.2 CC
947 - 952	C5 - CB	9C - A0	70 - 76	5B - 60	4F - 53
953 - 959	C4 - CA	9B - 9F	6F - 75	5B - 60	4E - 52
960 - 968	C3 - C9	9A - 9E	6F - 75	5A - 5F	4E - 52
969 - 975	C2 - C8	99 - 9D	6F - 75	5A - 5F	4E - 52
976 - 983	C1 - C7	99 - 9D	6E - 74	5A - 5F	4E - 52
984 - 993	C0 - C6	98 - 9C	6E - 74	5A - 5F	4E - 52
994 -1000	BF - C5	97 - 9B	6E - 74	5A - 5F	4E - 52
1001 -1008	BE - C4	97 - 9B	6D - 73	5A - 5F	4E - 52
1009 -1017	BD - C3	96 - 9A	6D - 73	5A - 5F	4E - 52
1018 -1020	BC - C2	96 - 9A	6D - 73	5A - 5F	4E - 52
1021 -1025	BC - C2	95 - 99	6D - 73	.5A - 5F	4E - 52
1026 -1031	BB - C1	95 - 99	6C - 72	.5A - 5F	4E - 52

'PCB+' ONLY

TABLE 2 "**PCB+** ALLOWABLE RANGE"(from A-O1785, Fig. 2)

GO TO STEP 5

Step 4 CONTINUED....

ORIGINAL PCB DISTORTION TEST:

SET UP:AS PER SOUND LEVEL TEST, EXCEPT FOR THE CENTER FREQUENCY OF THE FILTER.
THE MEASURED LEVELS SHALL NOT EXCEED THOSE SHOWN BELOW:

FILTER CENTER FREQ. (Hz)	MAXIMUM SOUND LEVEL (dB)
500	55
1000	49
2000	39

ORIG PCB DISTORTION TEST LEVELS (from A-00848,sheet 1 of 2, note 5)

PCB+ DISTORTION TEST:

THE MEASURED LEVELS SHALL NOT EXCEED THOSE SHOWN IN AT LEAST ONE OF THE THREE MAXIMUM SOUND LEVEL COLUMNS BELOW.
NOTE: WHEN YOU START THE TEST AT 500 Hz AND MEASURE A SOUND LEVEL IN ONE OF THE COLUMNS BELOW, R E M A I N IN THAT PARTICULAR COLUMN FOR READINGS AT 630 Hz AND 1000 Hz. DO NOT SWITCH TO ANOTHER COLUMN.

1/3 OCTAVE FILTER CENTER FREQ. (Hz)	MAXIMUM SOUND LEVEL (dB)		
500	39.3	45.0	47.6
630	56.0	54.3	51.3
1000	38.3	40.0	45.5

PCB+ DISTORTION TEST (from A-01785, table 5)

.....

NOTE: After this point, the tests for Original PCB and PCB+ are identical.

Step 5

PERFORM PNEUMATIC SEAL PRESSURE TEST
(taken from A-01785 note#3. Good for both Original PCB and PCB+)
CONNECT UNIT TO A MANOMETER. WITH THE CALIBRATOR IN THE CALIBRATE MODE, DEPRESS “UP” BUTTON TO LATCH THE VALVE IN CLOSED POSITION. AT PRESSURES OF +300 dapa AND -300 daPa, THE LEAK RATE SHALL BE LESS THAN 12 daPa OVER A 5 SECOND PERIOD. TO RESET THE VALVE, FLIP THE CALIBRATE/RUN SWITCH TO THE RUN POSITION FOR APPROXIMATELY ONE SECOND. THEN FLIP THE SWITCH BACK TO THE CALIBRATE POSITION.

Section 2.4 Service MT 1 CALIBRATION PROCEDURE

Step 6

PERFORM PRESSURE CALIBRATION TEST:(taken from A-00849, pg.1,item 6, F&G)

A) **CONNECT** UNIT TO MANOMETER OR EXTERNAL PRESSURE SOURCE AT '0' daPa. AT 0 daPA, IF READING **IS** AT OR BETWEEN **89 - 8B** (HEX), **DO STEP B.** IF THE READING **IS NOT** AT OR BETWEEN **89 - 8B HEX AT 0 daPa**, THEN **ADJUST R26 TO OR WITHIN** THESE VALUES.

B) **PRESSURIZE** UNIT TO +200 daPa. IF READING **IS** AT OR BETWEEN **B1 - B3** (HEX), THEN **DO STEP C.** IF READING **IS NOT** AT OR BETWEEN **B1 - B3 AT +200 daPa,** (HEX), THEN **ADJUST R31** TO AT OR WITHIN THESE VALUES. **REPEAT FIRST TWO STEPS A & B UNTIL YOU ARRIVE AT THESE VALUES THEN GO TO STEP C.**

C) **PRESSURIZE** TO **-300 daPa. IF READING IS** AT OR BETWEEN **49 - 53** (HEX), THEN **GO TO STEP #7.**

CAUTION: DO NOT MAKE ADJUSTMENTS SOLELY ON THE BASIS OF THE -300 daPa READING. Doing so will un-do prior adjustments. If the reading **IS NOT** at or between **49-53** (HEX), DO NOT ADJUST THE POTS AT -300 DdaPa. **DO A OR B BELOW:**

A ..... IF THE READING IS ABOVE 53 HEX: (readings will be high if the 'span' is too narrow.) **TURN R31 CLOCKWISE TO INCREASE** the 'span' between 0 and +200 daPa **IMPORTANT: RE-CHECK at 0 and +200 daPa to verify that unit is within spec.**

B ..... IF THE READING IS BELOW 49 HEX: (readings will be low if the 'span' is too wide.) **TURN R31 COUNTER CLOCKWISE TO DECREASE** the 'span' between 0 and +20 daPa. **IMPORTANT: RE-CHECK AT 0 and +200 daPa to verify that unit is within specifications.**

Step 7

VENT RATE TEST:

MAKE SURE THE MICROTYMP 1 IS IN THE 'CALIBRATION' MODE AND IS PRESSURIZED TO +250 daPa. NOW ENTER THE 'RUN' MODE TO VENT THE SYSTEM AND TIME THE PRESSURE DROP. THE PRESSURE MUST DROP TO 0 daPa WITHIN 1 SECOND.

Step 8

SWEEP RATE TEST: See Figure Step 8 below.

WITH THE PROBE TIP COUPLED TO A 1cc CAVITY, THE SWEEP RATE SHALL BE SET AT OR BETWEEN 2.40 - 2.55 SECONDS BY ADJUSTING R39. MEASURE FROM LEADING EDGE OF FIRST PULSE TO LEADING EDGE OF 26TH PULSE (which is 2.40-2.55 sec.)

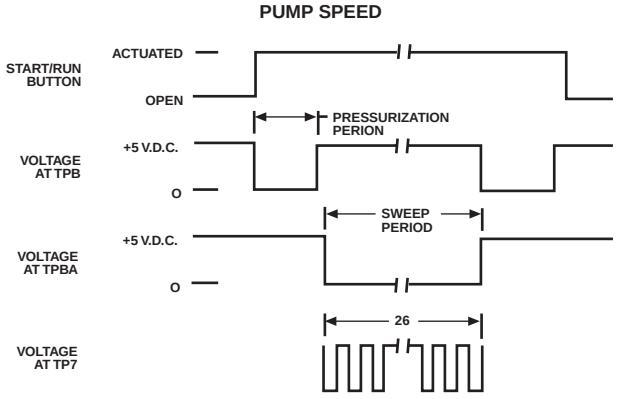


Figure Step 8 "PUMP SPEED" (from A-01785, Fig.1).

Step 9
PUMP PRESSURIZATION TEST:
WITH THE TIP COUPLED TO A 1cc CAVITY, AND THE START/RUN BUTTON ACTIVATED, THE PRESSURIZATION PERIOD SHALL BE .5 - 1 SECOND. See Fig."Step8" page 16.

Step 10
PUMP SPEED AND LINEARITY TEST: (EVEN THOUGH STEP 8 AND 9 REQUIREMENTS MAY BE MET, ***DO NOT SKIP THIS STEP 10.*** THE REASON IS THAT THE PUMP MAY NOT BE ABLE TO PERFORM A TYMP WITH A 2 CC CAVITY EVEN THOUGH IT PASSED WITH THE SMALLER CAVITIES IN STEPS 8 AND 9. THE UNIT MUST BE ABLE TO RUN A COMPLETE AND ACCURATE TEST ON CAVITY SIZES UP TO 1.9cc. *TEST WITH A 2CC CAVITY.* MEASURE THE PULSES AT TEST POINT 7, DURING THE SWEEP PERIOD. SPECS ARE BETWEEN 50 - 150 Ms.

Step 11
PUMP NOISE TEST:
WITH THE UNIT COUPLED TO A .5cc CAVITY, PRESS THE START/RUN BUTTON. THE RESULTING FLAT LINE OF THE TEST SHALL NOT DEVIATE BY MORE THAN 1 PIXEL.

Step 12
OPEN DETECT TEST:
WITH TIP OPEN TO THE ATMOSPHERE, DEPRESS THE START/RUN BUTTON MOMENTARILY. THE OPEN SYMBOL (on handle label) SHALL FLASH REPEATEDLY ON THE LCD.

Step 13
BLOCK DETECT TEST:
WITH THE PROBE TIP OCCLUDED, PRESS THE START/RUN BUTTON. THE UNIT SHALL DISPLAY THE BLOCK SYMBOL (on handle label) ALTERNATING WITH THE RUN SYMBOL ON THE LCD.

Step 14
LEAK DETECT TEST:
RUN THE UNIT IN A 1cc to 2.cc TEST CAVITY. WITH THE UNIT UNDER A POSITIVE PRESSURE, (BETWEEN +200 AND 0 daPa), PULL THE CAVITY AWAY FROM THE UNIT. THE RUN AND LEAK INDICATORS, (shown on the handle label) SHALL APPEAR ON THE LCD.

Step 15
MEMORY RECALL TEST:
RUN AN EAR SIMULATOR TEST FOR THE RIGHT MEMORY AND STORE IT, THEN RUN ONE FOR THE LEFT EAR AND STORE IT. ALLOW THE UNIT TO TIME OUT (APPROX 40 SECONDS FOR AUTO-OFF). RESTART THE UNIT AND VERIFY THAT BOTH TESTS ARE STILL THERE AND ACCURATE.

Step 17
ERASE TIME TEST:
PUSH 'LEFT EAR' BUTTON. 'BLANK' MEMORY SYMBOL WILL DISPLAY FOR 2.7 - 3.3 SECONDS. THIS TIME MAY BE MEASURED BY THE INTERVAL BETWEEN THE CORRESPONDING PULSES AT TEST POINT 7. ADJUST R21 TO ACHIEVE THIS SPECIFICATION.

Step 18

DISPLAY TEST:
IN THE CALIBRATION MODE, ALL SEGMENTS OF THE DISPLAY SHALL BE LIT AND CONSISTENT.

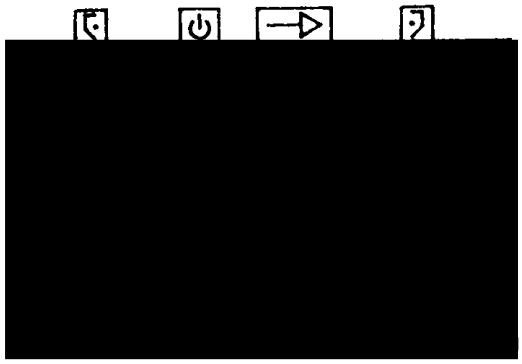


FIGURE STEP 18 "DISPLAY TEST PATTERN" (from A01785 fig.3H)

Step 19

CHARGE CURRENT TEST:
REFERENCE A-01777 TEST SPEC. FOR LEVEL 3, STEP 6.
SETUP AMMETER IN LINE BETWEEN A 14 VDC POWER SOURCE AND THE MICRO TYMP 1 (WITH BATTERY). ACCEPTABLE READING IS 5.7 TO 7 MILLIAMPS.

END CALIBRATION

CALIBRATION NOTES: date____/____/____

Section 2.4 Service MT 1 CALIBRATION PROCEDURE

CALIBRATION NOTES: date____/____/____

Section 2.5 Service

MicroTymp 1 High Altitude Modification:

When Required:

The standard Micro Tymp 1 can be modified at the customers expense, to operate within specifications at high altitudes. This is the only Welch Allyn authorized modification and is recommended when MicroTymp 1 is to be used at higher altitudes. See Drawing 236250 on next page 20.1. Send a copy of this chart on pg 20.1 to customer when such modifications are performed.

Since the reduced air density at higher altitudes will cause the constant speed pump to run longer to achieve a given pressure, a "Tymp" at a higher altitudes will take longer to complete.....if the MicroTymp 1 is set to specifications at sea level. By shortening the sweep rate time (when adjusting the MT1 at a lower altitudes), and removing the added volume of the second ballast, specifications can be met at end user locations at higher elevations above sea level. See procedure below.

Modification Procedure:

1. Disable the right ballast compartment by disconnecting the tube connected to it and sealing off the tube with appropriate plug and Black Max adhesive. Do not remove the ballast. (See figure 2.1 below.)

2. Go through the complete calibration procedure. The sweep rate will be addressed in the procedure. Since sweep rate will change as air density changes from one altitude (where you calibrate), to another (where the instrument will be used), we can anticipate these changes and compensate for them by adjusting the sweep rate times. Subtract .5 seconds for every approximately 6,000 foot increase in elevation where it is to be used.

Documentation:

Mark the serial number tag and any paperwork with the suffix "H" to designate that the high altitude modification has been made on this particular unit. The MicroTymp 1 will only be accurate for the altitude it has been adjusted for. Bringing it back down to sea level will leave the MicroTymp 1 out of specification (too fast) until the ballast is connected and the unit is re-calibrated.

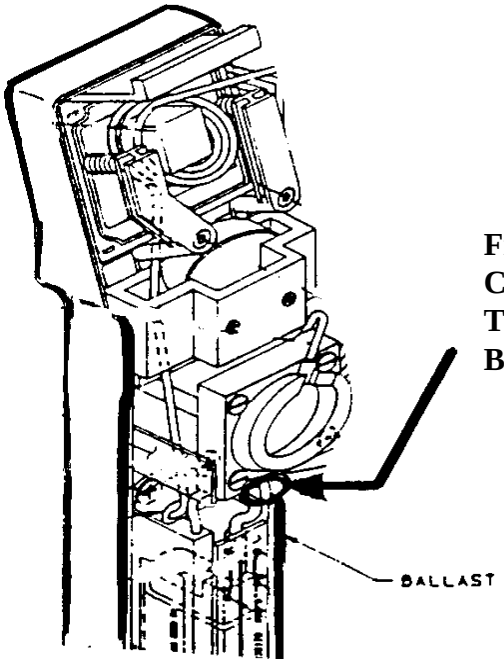


Fig. 2.1 Cut & Seal Tube to R. Ballast

Section 2.5 Service

MICROTYMP 1 HIGH ALTITUDE MODIFICATION

Your Microtymp has been specially modified for use at high altitudes. Therefore, the following information should be added to page 3:

Actual Vol. Elevation	Increase in +200 Vcc .0cc	1.0cc	1.5cc	2.0cc
1850m (6100 ft.)	+.1	+.3	+.4	+.5*
2300m (7500 ft.)	+.1	+.3	+.5	—
2700m (8800 ft.)	+.2	+.4	+.6	—
3100m (10,100 ft.)	+.2	+.5	+.7	—
3400m (11,200 ft.)	+.3	+.5	+.8	—
3750m (12,300 ft.)	+.3	+.6	+.9	—
4100m (13,400 ft.)	+.3	+.7	+1.0*	—

*Above this elevation, +200 Vcc reading of this volume is over instrument's range. "Open" symbol will result.

This also affects the 1.9cc Quick Check Cavity. Over 6100 ft., it cannot be used (see page 18).

DRAWN CFH	DATE 6-16-88	WELCH ALLYN, INC. SKANEATELES FALLS, N.Y. U.S.A.	
CHECKED		TITLE: HIGH ALTITUDE INFORMATION PAGE	
APPROVED		CODE IDENT. 64475 / B / DRAWING NO. 236250	REV A
REL FOR PROD 6/24/88		SCALE FULL	SHEET 1 OF 1

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

INSTRUMENT: MICROTYMP 1 HANDLE
MODEL #: 23600

PROBLEM:	CAUSE:	CORRECTIVE ACTION:
1. NOISY DISPLAY	*DEF. MOTOR	*REPLACE MOTOR
	*DEF. PUMP	*REPLACE PUMP
	*MIS-ALIGNED MOTOR PADS	*RE-ALIGN PADS
2. LCD LINES OUT	*DIRTY CONTACTS	*CLEAN LCD BOARD CONTACTS (99% IPA)
	*DEF. LCD FRAME (CLEAR BEZEL)	*REPLACE LCD FRAME
	*COLD SOLDER ON IC ..	*RE-FLOW SOLDER
	*DEF. ZEBRA STRIPS	*REPLACE ZEBRA STRIPS
3. PRESSURE READING OUT OF SPEC.	*DEF. 'U-4'	*REPLACE 'U-4'
	*DEF. TRANSDUCER	*REPLACE TRANSDUCER
4. PUMP STICKS	*PULLEY HAS SEPARATED FROM PISTON DIAPHRAGM	*RE-ADJUST SET SCREW
	*DEF. PISTON DIAPHRAGM	*INSTALL .095" PAD
	*DEF. DRIVE BELT	*REPLACE DRIVE BELT
	*DEF. OPTICAL INTERRUPT (O.I.).....	*REPLACE O.I.
5. MT 1 DOES NOT ACTIVATE	*CORRODED BATTERY CONTACTS	*CLEAN OR REPLACE CONTACTS
	*LOW BATTERY VOLTS ...	*CHARGE OR REPLACE BATTERY
	*DIRTY PUSHBUTTON CONTACTS	*CLEAN OR REPLACE CONTACTS

Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

MODEL #: 23600

PROBLEM:	CAUSE:	CORRECTIVE ACTION:
6. MECHANICAL LEAKS PRESENT.	*VALVE LEAKS	*CHECK / REPLACE VALVE
	*'T' FITTING LEAKS.	*CHECK / RESEAL / REPLACE
	*PROBE TIP LEAKS	*REPLACE PROBE TIP
	*PISTON DIAPHRAGM.....	*RESEAL / REPLACE
	*OTHER COMPONENTS	*REPLACE ACCORDINGLY
7. LCD "LEAK" SYMBOL CUSTOMER CAN'T GET A 'SEAL'	*INSUFFICIENT CAPACITY ..... ALTITUDE. IF UNIT WORKS	*CHECK / REPLACE DIAPHRAGM *CHECK CUSTOMER'S WELL AT YOUR LOWER ALTITUDE, THEN MAKE HIGH ALTITUDE MODIFICATION. (UTILIZES ONE BALLAST). SEE SECT. 2.5 IN THIS MANUAL.
	*PRESSURE CIRCUIT OUT OF ADJUSTMENT	*READJUST GAIN SECTION OF PRESSURE CIRCUIT
8. NO 'DELTA' COMPLIANCE	*NO SOUND	*CHECK / RESTORE SOUND
	*CLOGGED PROBE TIP.....	*CLEAN PROBE TIP TUBES
	*DEF. CRYSTAL	*REPLACE CRYSTAL
	*DEF. SPKR. OR MIC	*REPLACE DEF. COMPONENT
	*COLD SOLDER JOINTS	*REPAIR SPKR./MIC.JOINTS
9. COMPLIANCE DOES NOT ADJUST	*DEF. MICROPHONE	*REPLACE MIC.
	*INTERMITTENT POT(S)... IF BOARD TAPPED/FLEXED	*REPLACE POT(S) SEE NOTE* BELOW.
	*COMPONENT DISLODGED FROM PROBE TIP	*CHECK PROBE TIP TUBES TO COMPONENTS

***NOTE:**

1-WITH NO CAVITY ON PROBE TIP AND PCB IS TAPPED OR FLEXED:
PIN 25 IS 100MVDC. IF ERRATIC, **REPLACE R24**

2-WITH 2CC CAVITY ON PROBE TIP AND PCB IS TAPPED OR FLEXED:

A PIN 20 OF U4 IS 2.5VDC. IF ERRATIC, **REPLACE R33**
B IF VOLTAGE AT PIN 5 OF U11 IS ERRATIC, **REPLACE R70**
C IF VOLTAGE AT PIN 7 OF U11 IS ERRATIC, **REPLACE R69**

10. NO SOUND/FAILS DISTORTION	*DEF. SPEAKER	*REPLACE SPEAKER
	*COLD SOLDER JOINT	*REFLOW SOLDER
	*DEF.U-5 (3080E)...	*REPLACE U-5 PN.230047
	*DEF.U-4 (HI2340P-A)	*REPLACE U-4 PN.23609-2

END HANDLE TROUBLESHOOTING

Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

INSTRUMENT: PRINTER FOR MICROTYMP 1
MODEL #: 71130

PROBLEM:	CAUSE:	CORRECTIVE ACTION:
1. DOES NOT POWER UP (NO GREEN LIGHT)	*OPEN FUSE	*VERIFY / REPLACE FUSE
	*DEF. TRANSFORMER	*REPLACE TRANSFORMER
2. PRINT-OUT TOO LIGHT OR DARK	*CONTRAST SETTING OUT OF SPEC	*RESET CONTRAST TO SPEC.
3. DEFECTIVE PRINT	*DEF. PRINT-HEAD	*REPLACE PRINT-HEAD
	*DEF. PLATEN BAR	*REPLACE PLATEN BAR
4. PRINTOUT READS "NO HANDLE"	*DIRTY WELL CONTACTS	*CLEAN CONTACTS
	*DEF. CONNECTING CABLE	*REPAIR CABLE
5. PAPER DOES NOT FEED	*PAPER JAM	*CLEAR AND RESTORE PAPER
	*COLD SOLDER JOINT AROUND RESET CONTROLLER	*REFLOW SOLDER JOINT
	*DEF. FEED BUTTON	*REPLACE BUTTON
6. NOISY PRINTER	*MIS-ALIGNED GEARS ON MODULE	*RE-ALIGN GEARS
	*DEF.PRINTER MODULE	*REPLACE MODULE
7. DOES NOT PRINT	*PAPER IN BACKWARDS	*INSTALL PAPER CORRECTLY

END PRINTER TROUBLESHOOTING

Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

Summary of failures and possible sources:

1. Microtymp displays Leak Symbol only...
    a. a hose could be pinched
    b. pump pad is not placed properly
    c. the motor case is open
    d. there is grease on the belt
    e. there is a broken motor lead
    f. the motor is defective
    g. the system is clogged somewhere
    h. there is a leak in the system
    i. the valve is defective
    j. pump pressure is insufficient
    k. the diaphragm has a hole in it

2. Microtymp displays NON-FLASHING Open Symbol only....
    a. pump pad is not placed properly
    b. the motor case open
    c. there is grease on the belt
    d. the motor is defective
    e. the diaphragm piston is mis-aligned

3. Microtymp displays Pressure Range Error only.....
    a. there is blockage between the probe tip and the valve.
    b. the hose is pinched
    c. cold solder joint at: valve at printed circuit board
    d. cold solder joint at: pressure transducer
    e. cold solder joint at: valve wire at printed circuit board
    f. the unit is out of calibration

4. Microtymp will not turn on....
    a. deformed 7.2 v ground contact
    b. deformed 3.6 v contact
    c. broken wire to 3.6 v contact
    d. battery labeled incorrectly
    e. battery will not take a charge above 6 volts
    f. motor leads are shorted
    g. data error
    h. start-run switch is not pulling pin 6 of U2 ‘low’.

5. Row or column of LCD display non-functional....
    a. defective LCD assembly
    b. broken Flex Cable

6. Battery cover cannot be removed....
    a. screw stripped
    b. insert stripped

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Summary of failures and possible sources continued...

7. Fails noise...
    a. U6 and or U7 defective
    b. U4 defective
    c. speaker and or microphone defective

8. Noisy display...
    a. shock absorbing pump pads are not seated properly
    b. pulley set screw is not adjusted properly
    c. noisy motor

9. Fails linearity...
    a. low capacity pump
    b. loose set screw
    c. set screw too tight
    d. small leak in system

10. Cannot set Compliance or not enough range...
    a. open or shorted speaker
    b. open or shorted microphone
    c. defective pre-amp (U11 and associated components)
    d. defective Y1

11. Compliance readings erratic...
    a. defective R24, and or R33, and or R70, and or R69

12. Block symbol with open probe tip...
    a. compliance reading erratic (defective R24,33,70,69)

13. Cannot set pressure to 89-8B with R26, or to B1-B3 with R31...
    a. defective pressure transducer
    b. defective R26
    c. defective R31

14. Cannot set sound to 84 dB....
    a. defective speaker
    b. defective U4
    c. defective amplifier (U5) circuit

15. Data Error..
    a. CTS or data line open
    b. defective receiver (CTS) circuit
    c. defective driver (data) circuit
    d. defective micro-controller (U2)

16. Calibrator reads “FF”...
    a. defective Q8 or Q9
    b. +5 vdc is missing

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

17.Pump does not return to home position...
- a. defective Q1 or Q2
- b. open trace in flex cable
- c. defective optical interrupt
- d. diaphragm/piston has disconnected from top of drive helix

18.Low battery symbol...
- a. defective R66, C17, or U4
- b. defective R65, R19, or open trace n flex cable

19.Battery will not charge...
- a. defective C5
- b. defective RT1
- c. defective U10
- d. defective battery
- e. defective Q15 or Q16

TROUBLESHOOTING NOTES: date____/____/____

Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

Explanation of MicroTymp Symbols as they relate to troubleshooting:

LEAK SYMBOL

The Leak Symbol is displayed when the Tymp cannot build pressure to +200 daPa in order to start a reading (tymp). This symbol will also be displayed during tympanogram if the pressure suddenly drops toward 0 daPa, unless the tympanogram has progressed past the curve (about -150 daPa).

OPEN-FAST FLASHING SYMBOL

The fast flashing Open Symbol is displayed when there is no compliance change or when compliance is very ha high (approximately 3.4 cc or higher). The reading on calibrator is 'D0' or higher.

OPEN-SLOW FLASHING SYMBOL

The slow flashing Open Symbol is displayed when compliance is too high for the processor to identify but low enough for the processor to detect (approximately 2.1 cc to 3.4 cc). The reading on the calibrator is about A0 to CF.

BLOCK SYMBOL

The Block Symbol is displayed when the compliance is too low for the processor to identify (approximately .2cc or lower). The reading on the calibrator is 4F or lower.

LOW BATTERY SYMBOL

The Low Battery Symbol is displayed when the 7.2 VDC rated source, either battery or power supply, is between 6.2 VDC - 6.5 VDC, or lower. Reading on the calibrator is 4F or lower.

Note: If checking for a low battery problem, the low battery symbol will not come on if the tymp is in the fast flashing open mode, even if the voltage is low enough to trigger the low battery symbol. In order to check for this, you must recall either the left or the right memory. Hold until blank memory appears. If voltage is high enough, blank memory symbols (---- ----) will remain. If voltage is low, low battery symbol will appear.

PRESSURE RANGE ERROR SYMBOL

The Pressure Range Error Symbol is displayed when the pressure at the start of the tymp is below "60" on the calibrator, (about -210 daPa) or above "9F on calibrator (about +105 daPa).

SAVE DATA PLOT SYMBOL

Save Data Plot Symbol is displayed when the tympanogram has progressed to the point where the important information has been graphed (-150 daPa), and, for some reason, the tymp can not finish the graph. The processor breaks the tympanogram and prints the remainder at the top of the screen.

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Problem: Buttons Stick

Possible Causes:
1. Button soldered to circuit board crooked
2. Interference between button and switch

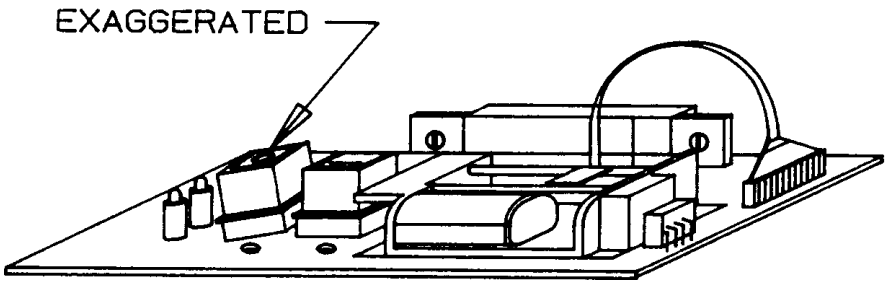
Repair

1. **CAUTION:** **Prior to doing any work:**
   Unplug power cord
   Use grounding mat and grounding strap

2. Disassemble stand to step #3 (removing the top housing, page 5).

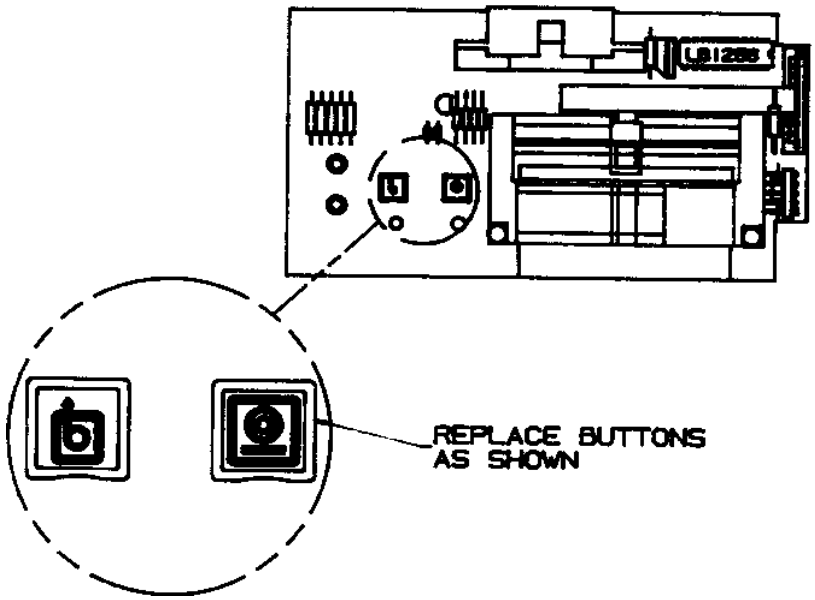
3. Check to see that the black switches are soldered flush to the board.

4. If they are crooked (See fig below), heat up solder on the 2 pins and straighten.



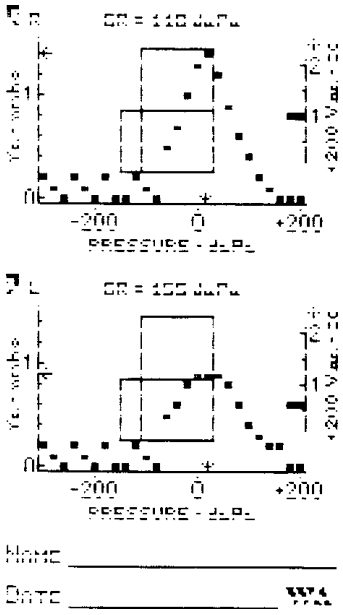
5. If switches are ok, the white print and feed buttons need to be replaced. To do this pull them straight off and replace them as shown in the figure below.

6. Assemble stand and check operation.



Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING



Problem: Missing lines in printout (See sample at right)

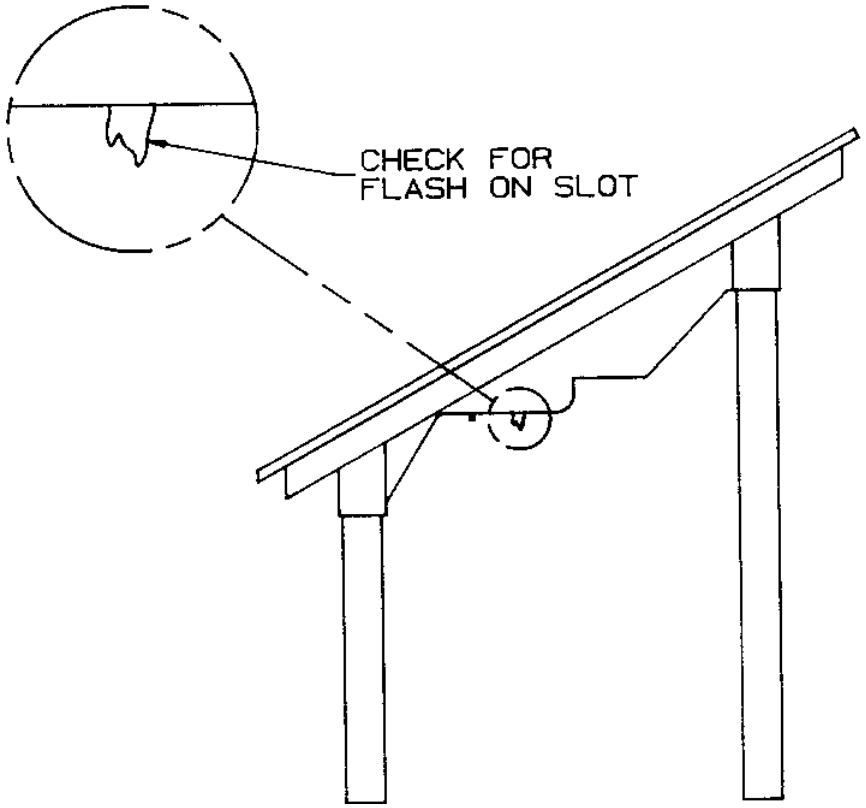
Possible causes:
1. Flash on paper feed slot.
2. Nine pin flex connector cold solder joints
3. Printer element damaged
4. Printer driver defective bad (LB1256)

Repair:

1. CAUTION: Prior to doing any work:
   Unplug power cord.
   Use grounding mat and grounding strap.

3. Disassemble stand to step #3 (Removing top housing, page 5)

4. Check bottom of top housing slot to be sure there is no flash (see fig below) that may cause the paper to feed improperly. If ok, go on to the next step. If there is flash, replace the top housing with a new one, assemble printer/charger and check.

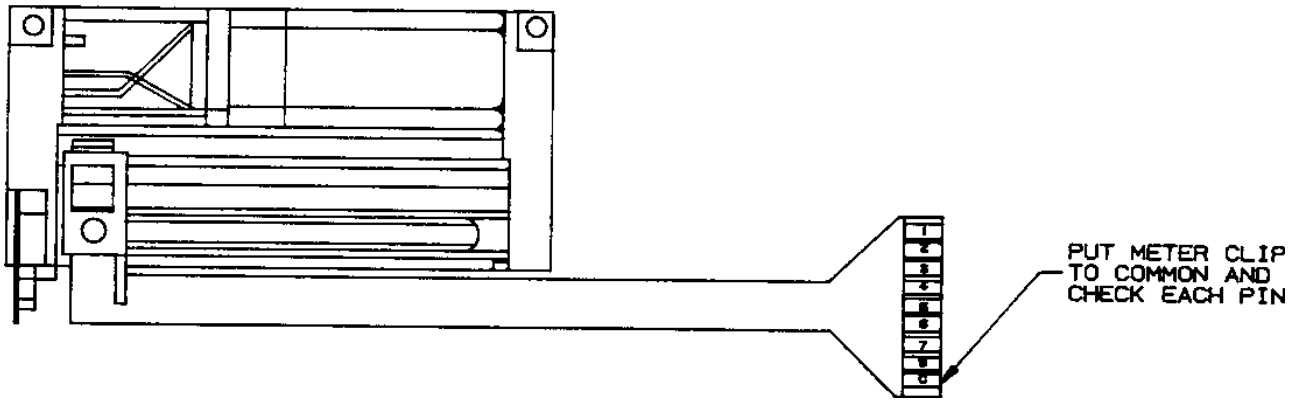


Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

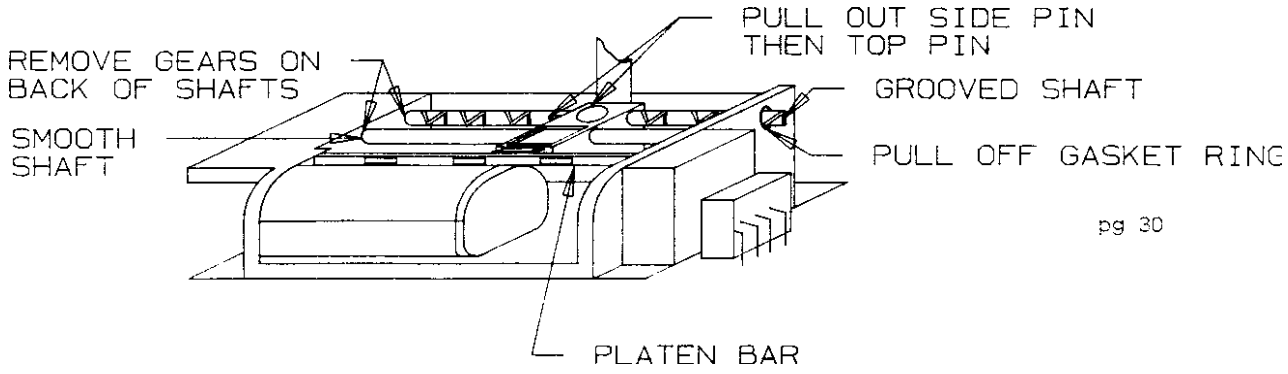
5. Disassemble stand to step #4 (Removing boards from housing, page 6)

6. Pull out the flex from the 8 pin connector. With an ohm meter check the pins of the flex to be sure none of the elements are damaged. To do this, put the common clip of your meter to C (see fig. below). With the other clip check each pin (1-8) to be sure that they are ok. The resistance of any element must not be greater than 22 ohms. The largest allowable difference of all elements on a printer is 3 ohms (e.g. if pin 1 was min at 14.5 ohms and pin 6 was max at 17.9 ohms the difference would be 3.4 ohms. This is defective). If all pins are ok, go to the next step.



Replace the printer head, remove the print switch (switch closest to the printer) by unsoldering the 2 pins on the bottom side of the board. Pull out the pins located on the side and top of the printer head (see fig.).

Remove the smooth shaft by pulling the pin from the gear on the side of the printer. Also remove the gear that the pin slides into and the flat gear to the back of it. With a pair of tweezers pull off the gasket ring located on the end of the grooved shaft. Slide both shafts part way out allowing enough room to remove the printer head. Remove the printer head from the shafts and replace with a new head (see fig.).



Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

To reassemble the printer, put the new head on and slide the shafts back in place. Push the gasket ring on the end of the grooved shaft. Press the gears back on the end of the shafts – the flat gear on the grooved shaft, the double gear on the smooth shaft – then press the pin into the gear. Slide the head along the shaft until the hole in the top is lined up with the a cross groove. Push the top pin in making sure it sits flush with the top of the head. Press the other pin in the side of the printer head, and plug the flex into the 20 pin connector. Assemble the printer/charger to the point where the top housing and the bottom plate are ready to be screwed on. The boards will be strapped in the housing with the wire tie and the power cord wires (black, white, and green or brown, blue, and yellow/green) will be tightened securely into the terminal block. Plug in the 4 pin wire jack that connects to the power supply board, coming from the charge and data contacts (containing the red, black, blue, and yellow wires). Recheck to see that the unit is assembled to this point before proceeding.

WARNING: Setting printer contrast requires working on disassembled unit while it is powered. Care must be taken to prevent electrical shock.

To set printer contrast you will need a frequency counter or an oscilloscope. Using a frequency counter, set it to the 10 khz scale. Using an oscilloscope set the volts/div scale to 1 and the time/div scale to 20 microseconds. Hook up clip leads/scope probe from the frequency counter or the oscilloscope by connecting the ground lead to the negative side of C1 capacitor. Clip the other lead to pin 8 of the CD4069UBE chip, making sure not to short any pins (see fig. page 13).

Check the letter on the underside of the flex circuit where the flex goes into the head of the printer. It will be an A, B, or C. With your frequency counter now hooked up, plug the printer/charger into a wall outlet. **CAUTION: After plugging printer/charger in do not touch any electrical components to prevent electrical shock.**

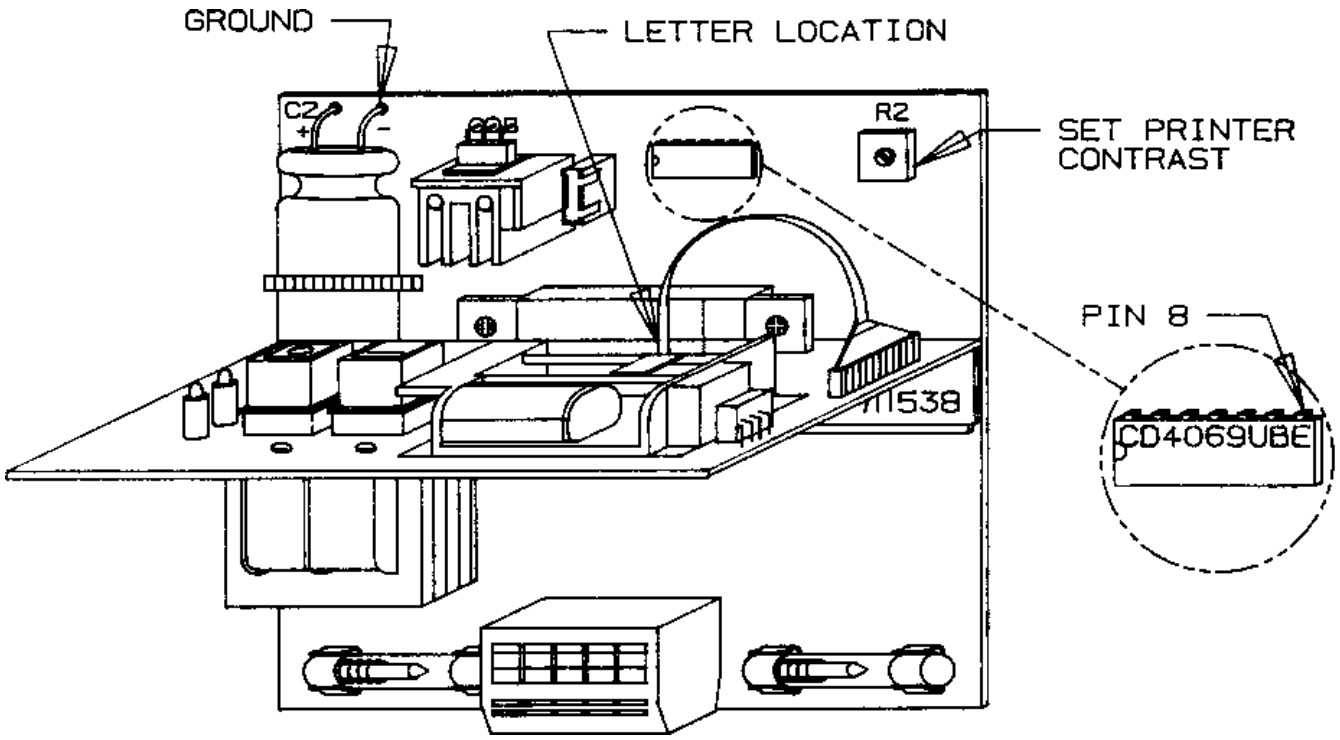
Place a handle containing data into the printer/charger and push the print button. With a screwdriver adjust the potentiometer R2 (see fig. page 13) so that the frequency falls within the range of the letter indicated on the printer (see chart below).

Letter A	9.8 - 10.0 khz
Letter B	10.9 - 11.1 khz
Letter C	12.0 - 12.2 khz

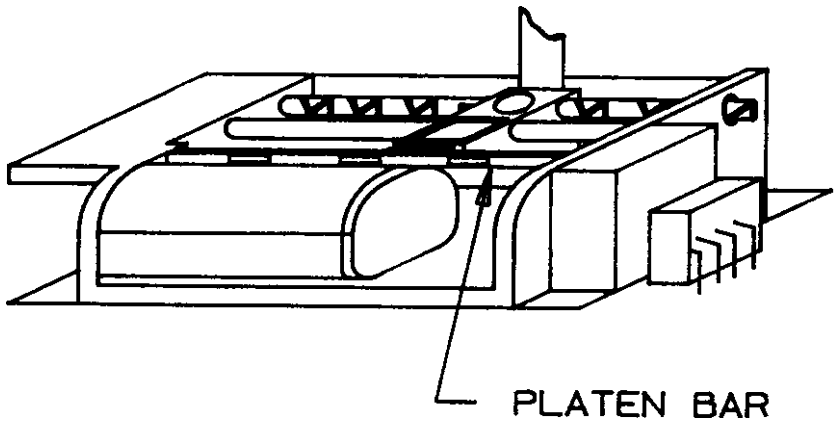
If using an oscilloscope, measure time from the beginning of the first pulse to the beginning of the second pulse. Adjust the potentiometer R2 until the valve falls within the correct range. Frequency=1/ time, so invert the reading and multiply by 1000 to get khz. **Unplug the power cord.** Fully assemble the stand and check operation.

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING



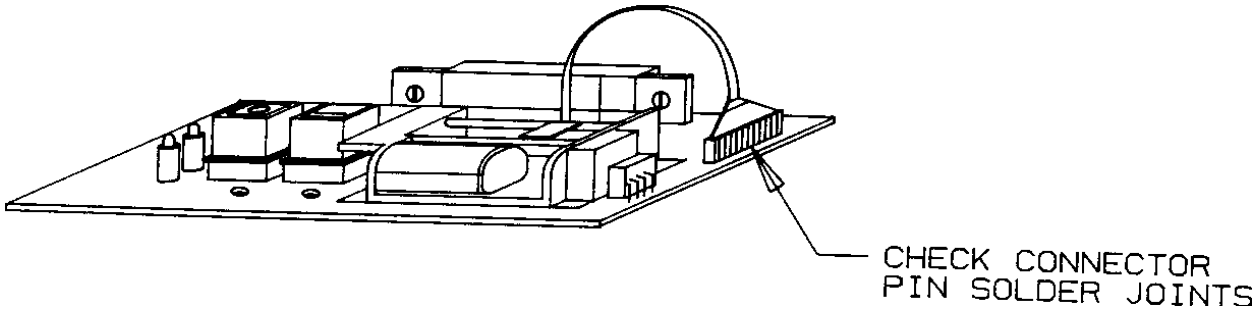
7. Check the platen bar that the printer head rides on for any nicks. If it is ok, go on to the next step. If it is damaged, replace it with a new one. To do so, rotate the grooved shaft clockwise until the printer head is all the way to the left end of the shaft. Remove the platen bar by pulling up on the right side of it and sliding it out from under the printer head (see fig.). Replace it with a new one by holding down the spring loaded paper guide and sliding the new platen bar back under the printer head. Be careful not to snap the pins on the ends of the platen bar.



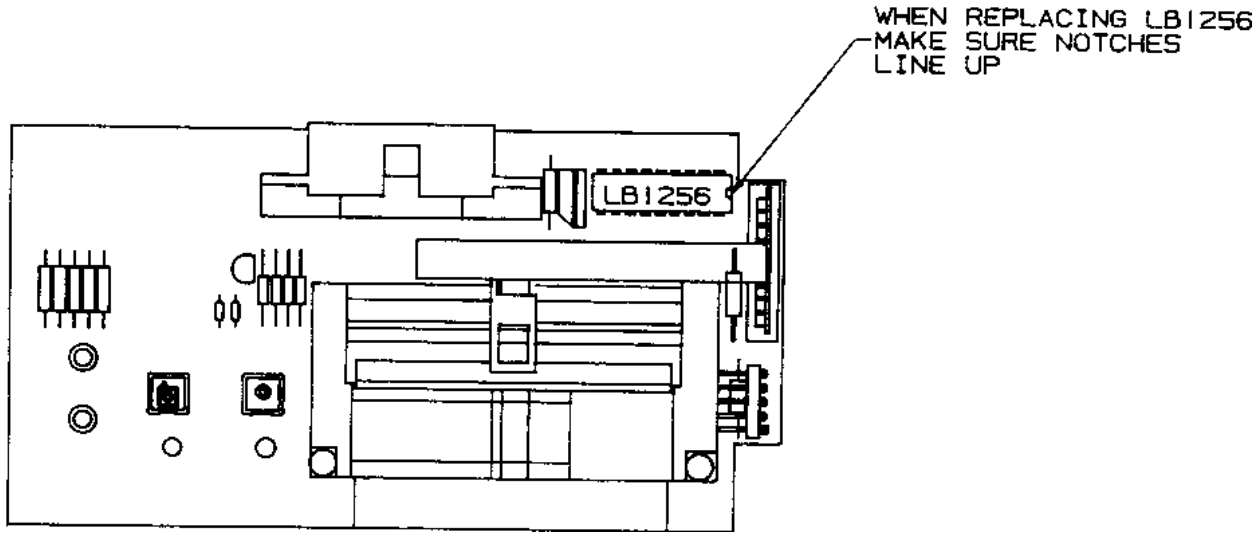
Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

8. Check the 9 pin connector that the flex plugs into, to be sure all pins are properly soldered to the circuit board. If they are ok go on to the next step. If they are not, solder them, assemble the printer, and check.



9. To remove the driver chip LB1256, first separate the 2 boards, step #5 (separating circuit boards page 7). Unsolder LB1256, and replace, making sure the notch on the chip lines up with the notch on the board. Solder LB1256 driver chip in place. Assemble unit and check operation.



Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Problem: Charge LED doesn't light when handle is in well.
Possible cause: 1. Cold solder joint on charge contact.

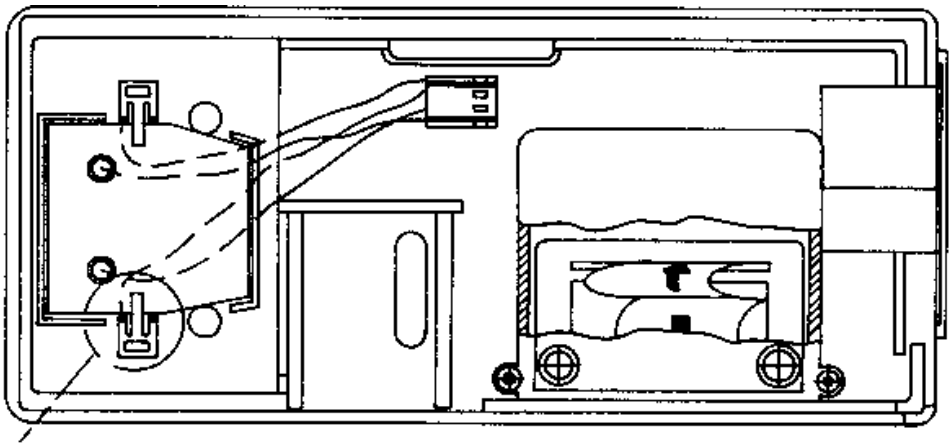
Repair:

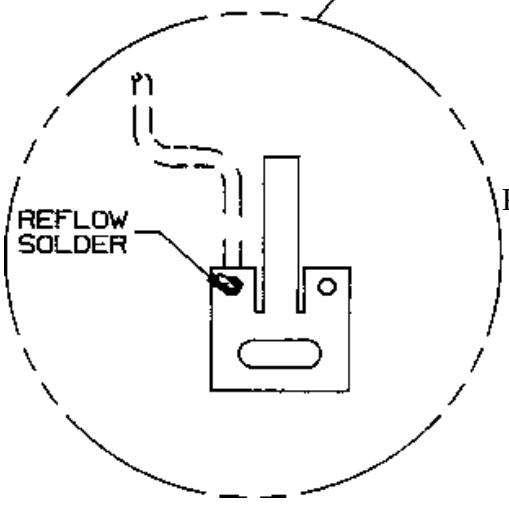
1. **CAUTION: Prior to doing any work:**
   Unplug power cord.
   Use grounding mat and grounding strap.

2. Disassemble up to and including step #3 (removing top housing, page 5).

3. With solder and soldering iron, reflow solder to side contacts, making sure not to apply heat too long.
   CAUTION: Applying too much heat will cause the housing to melt (see fig. below).

4. Assemble stand and check.





Problem: Charge LED (red) does not light when handle is in well.

Cause: Defective LED (only if handle downloads and printer prints out data properly).

Repair:
1. Observe caution on repair step 1 above.
2. Loosen PCB to access LED.
3. Remove faulty LED & discard.
4. Install new LED; short lead of new LED goes in hole with square pad.

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Problem: Printer/charger doesn't print or feed but green LED is on.
Possible cause: 1. Microprocessor locked up.

Repair:

1. Unplug stand and plug back in to reset microprocessor.

Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Problem: Prints no handle with microtymp in printer/charger.

Possible causes: 1. Possible handle problem.
2. Cord guard hits data contacts.
3. Cold solder joints on data contacts.
4. Pad interferes with data contacts.

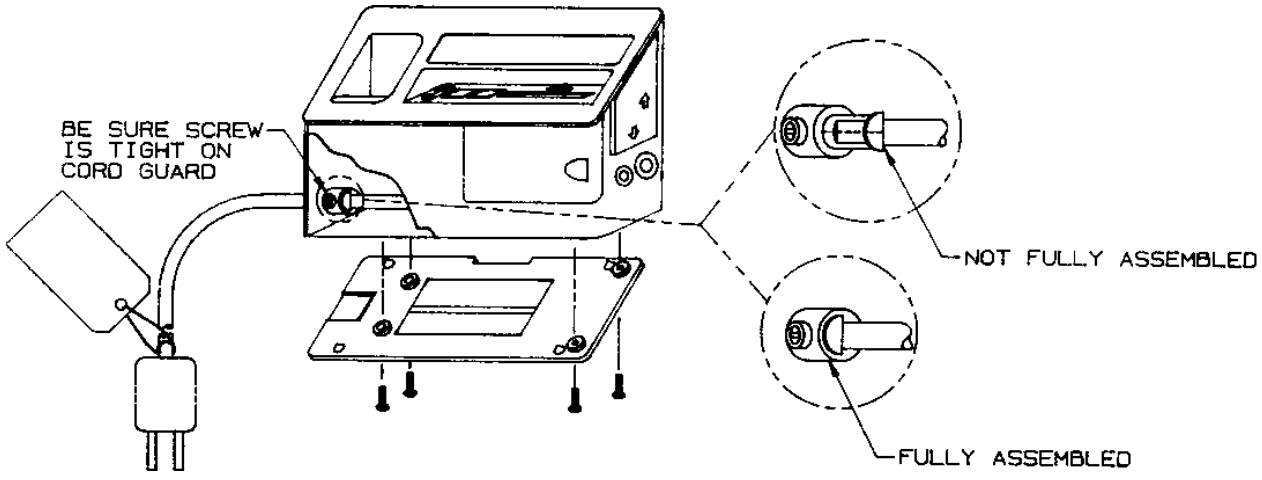
Repair:

1. Rule out handle problem by putting in another printer stand and checking printout. If handle is ok, go on to the next step.

2. **CAUTION: Prior to doing any work:**
Unplug power cord.
Use grounding mat and grounding strap.

3. Remove bottom plate by unscrewing 4 screws.

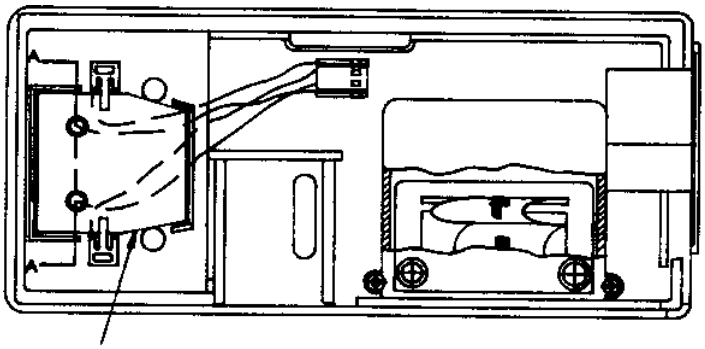
4. Check to see that the cord guard is tight and assembled fully into strain relief (see fig. below). If it is ok, go to the next step. If it is not, tighten and/or reposition it, assemble stand and check.

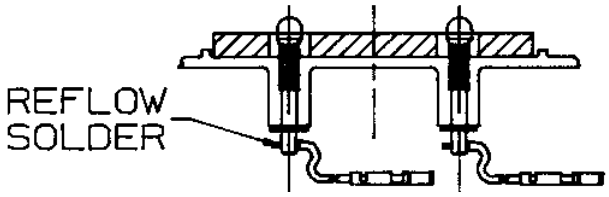


Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

5. With a soldering iron and solder reflow the solder that connects the blue and yellow wires to the data contacts. **CAUTION: Applying too much heat will cause the housing to melt.** Assemble stand and check. If the problem still exists, go on to the next step.





6. Check the data contacts for any interference that may be caused by the pad (see fig. page 17). If there is, disassemble stand to step #4 (removing the circuit boards, page 6). Pull out the pad and replace with a new one, ensuring there is clearance between pad and data contacts, assemble stand and check operation.

Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

Problem: Dead printer/charger (LED is not lit)

Possible causes: 1. Blown fuse
2. Wire not fastened securely in terminal block.

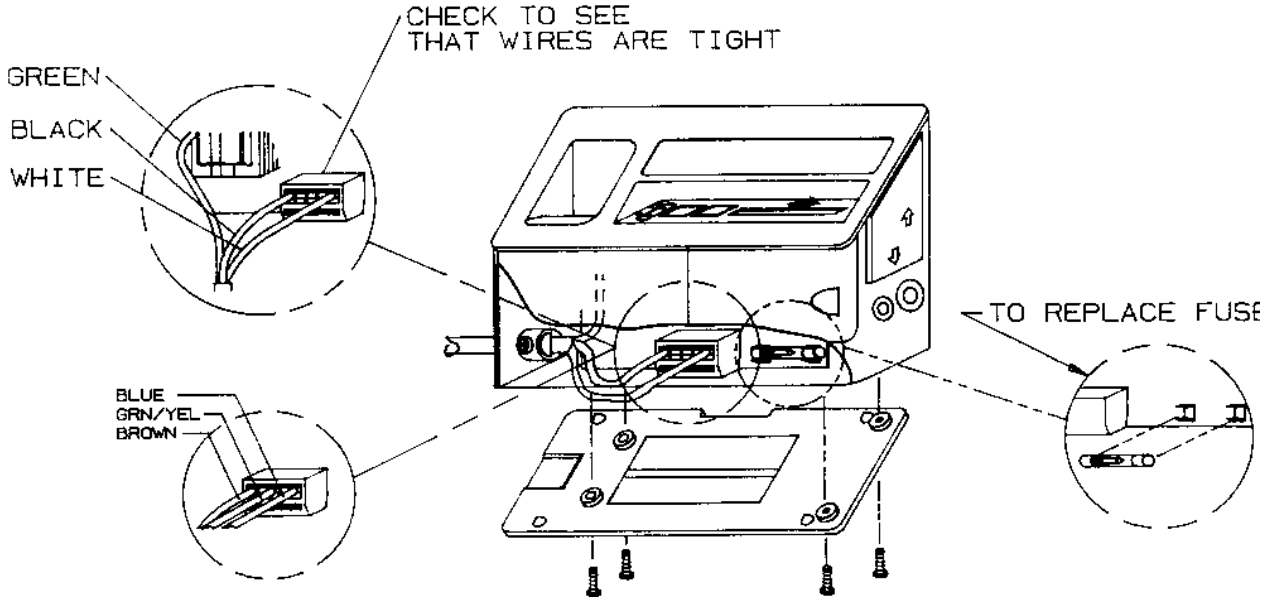
Repair:

1. **CAUTION: Prior to doing any work:**
Unplug power cord
Use grounding mat and grounding strap.

2. Remove bottom plate by unscrewing 4 screws.

3. Check to see that the fuses are not blown. If unsure, remove and check with an ohm meter. If blown (i.e. overload reading on the ohm meter) replace them. Assemble stand and check.

4. Check to see that the wires (black and white or blue, grn/yel and brown) from the power cord are tightly fastened into the terminal block. If they are, go on to the next step. If they are not, with the wires in place tighten the screws in the terminal block that correspond to those wires (see fig. below). Replace bottom plate and check.



Section 3.1 Service

MICROTYMP 1 TROUBLESHOOTING

Problem: Printer /charger continues to print or feed

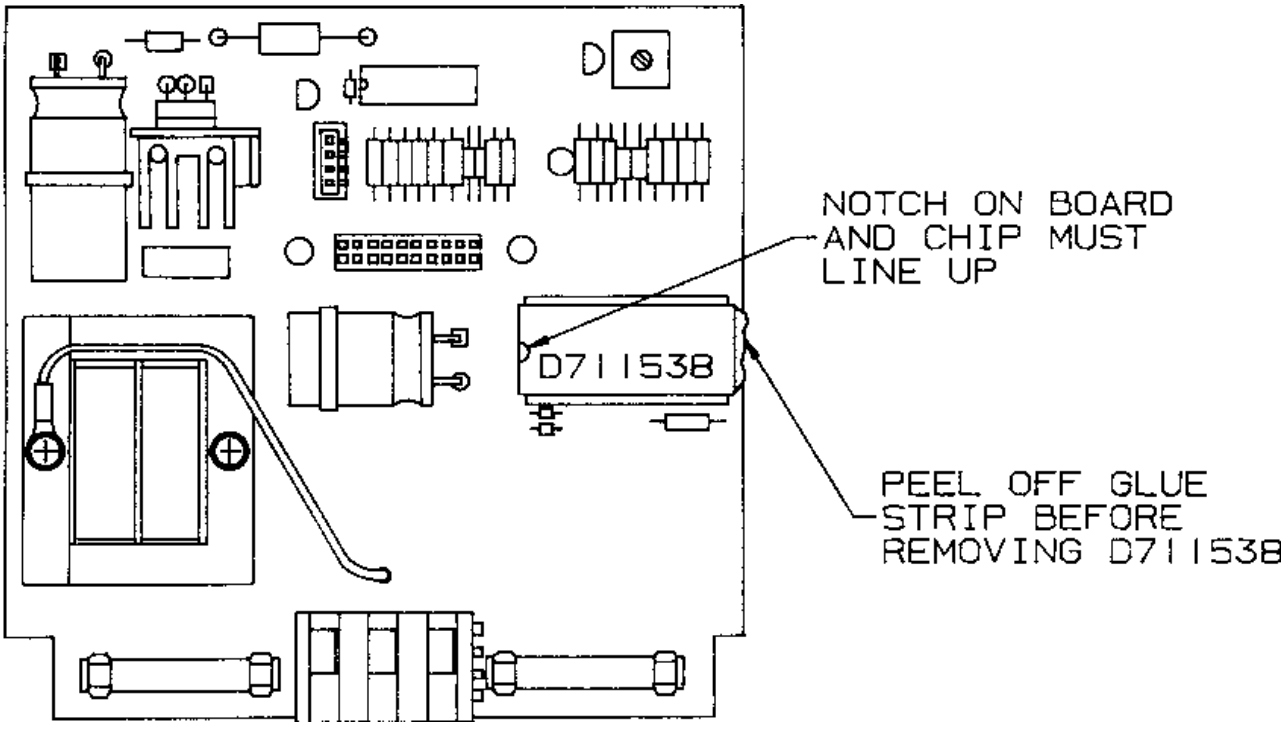
Possible causes: 1. Microprocessor locked up.
2. Microprocessor defective (D711538).

Repair:

1. Unplug and plug back in to reset microprocessor.

2. **CAUTION: Prior to doing any work:**
Unplug power cord
Use grounding mat and grounding strap.

3. Disassemble stand up to and including step #4 (removing circuit boards, page 6). To remove D711538 processor, peel off the glue strip and remove the chip with a flat screwdriver, prying up one end at a time alternating sides until the chip comes loose. Replace with a new chip making sure the notches on the chip and board line up (see fig. below). Assemble and check.



Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

Problem: Printer /charger has power, (green LED lit) but won't print.

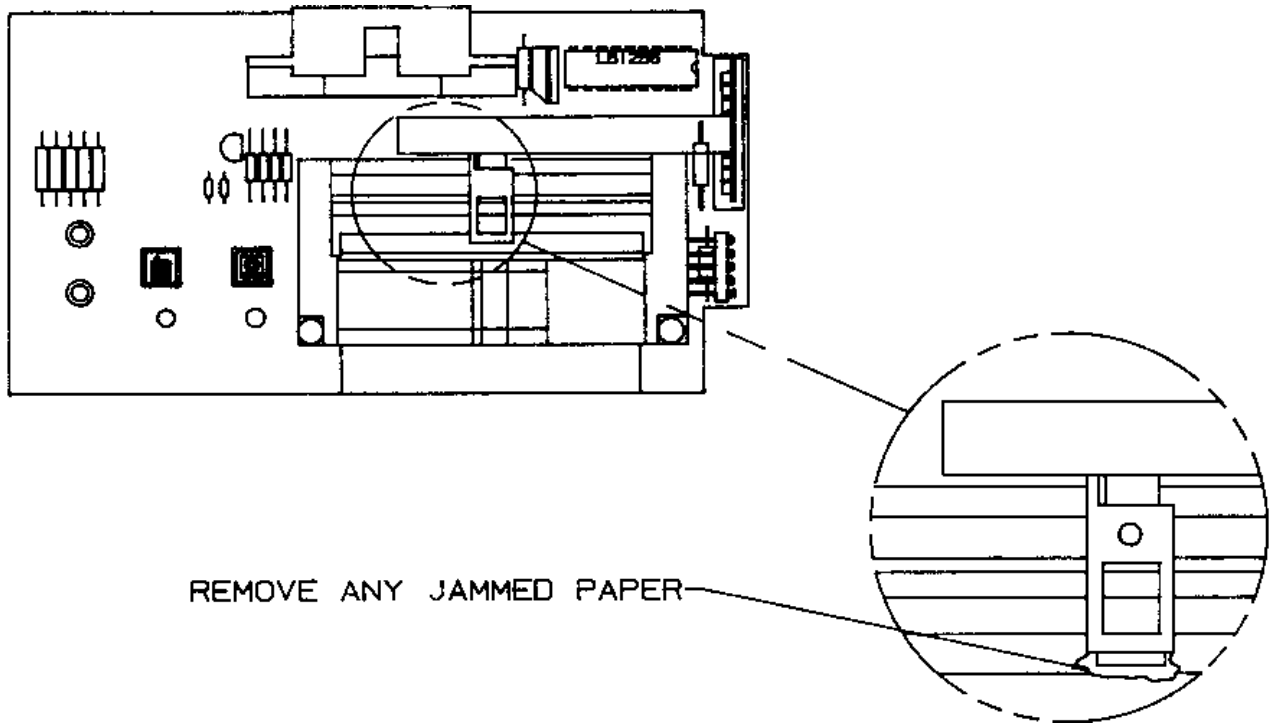
Possible causes: 1. Paper roll loose.
2. Paper jammed.

Repair:

1. Open door to paper. Check to see if roll is wound tight. If it is go on to the next step. If not, remove it and rewind the paper until it is tight. Feed the paper and check to see if it works.

2. **CAUTION: Prior to doing any work:**
Unplug power cord
Use grounding mat and grounding strap.

3. Disassemble the stand up to and including step #3 (removing the top housing, page 5). Check to see that no paper is jammed in the printer head (see fig. below). If there is, carefully remove it, making sure not to damage the printer. Assemble the stand, feed the paper and check.



Section 3.1 Service

M I C R O T Y M P 1 T R O U B L E S H O O T I N G

Problem: Printer /charger doesn't print but feeds.

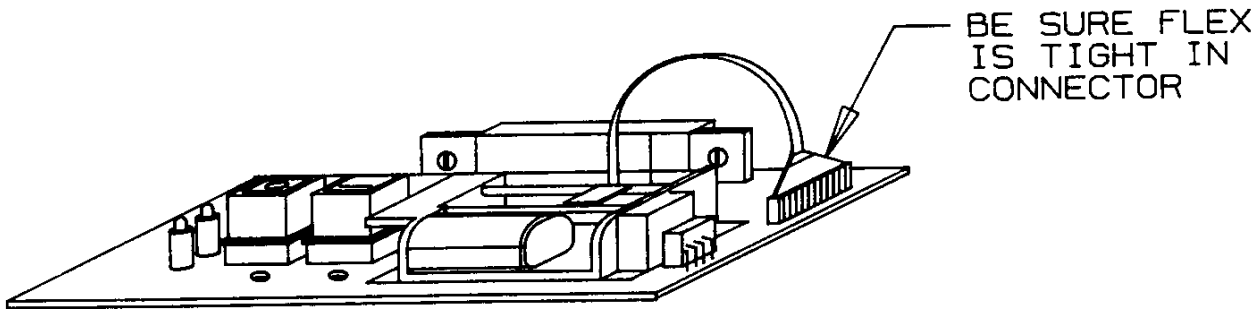
Possible causes: 1. Misfed paper.
2. Printer flex disengaged.

Repair:

1. Remove roll of paper and be sure that it has not been put in backwards. See label on paper housing. If it is ok, go on to the next step. Remove the paper in the printer by cutting it at the roll, and pulling through in the direction the paper normally feeds. **Do not pull paper through backwards.**

2. **CAUTION: Prior to doing any work:**
Unplug power cord
Use grounding mat and grounding strap.

3. Disassemble printer up to step #3 (remove top housing, page 5). Check to see that the flex strip is pushed all the way down into the connector (see fig. below). Assemble printer stand and check.



Section 4.1 Disassembly & Reassembly

Disassembly and Repair of the Handle SEE FIG. 4.1 NEXT PAGE.

A NORMAL MAINTENANCE : BATTERY COVER, BATTERY, RECHARGING BATTERY

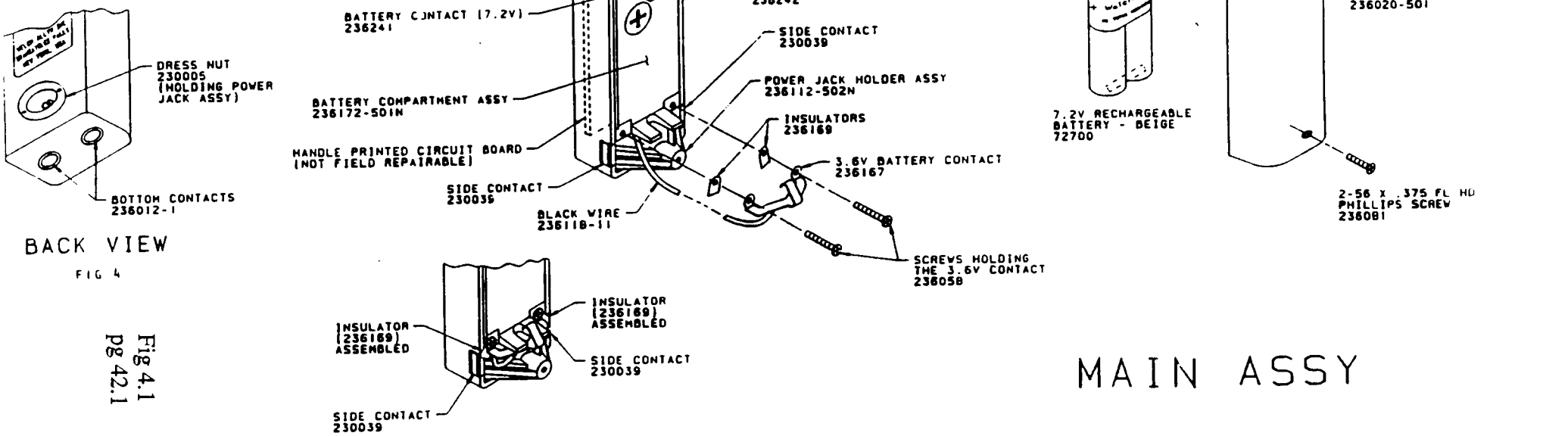
A 1. REFER TO PAGE 22 THROUGH PAGE 25 OF MICRO TYMP 1 OPERATING INSTRUCTIONS***** FOR REPLACEMENT OF BATTERY PN72700.
WARNING: INSERT BATTERY ONLY AS SHOWN ON PAGE 25 OF THE OWNERS MANUAL. FAILURE TO OBSERVE CORRECT POLARITY COULD CAUSE DAMAGE TO THE MICRO TYMP 1. WHEN IT IS NECESSARY TO REPLACE THE BATTERY, USE ONLY A WELCH ALLYN NO.72700 REPLACEMENT BATTERY. OTHER NON APPROVED BATTERIES MAY CAUSE RISK OF FIRE OR PRODUCT FAILURE.
CAUTION: The battery must be removed if the MicroTymp is going to be stored or placed anywhere other than in the Charging Stand (or connected to the Charging Transformer) for more than one month. Failure to do this can result in damage to BOTH the battery and the MicroTymp.

A 2. FOLLOW THIS PROCEDURE FOR DECIDING WHEN TO REPLACE THE NI-CAD BATTERY IN A MICRO TYMP 1 HANDLE: (READ THE CUSTOMER COMPLAINT FIRST.)

SCENARIO 1. If the unit **FUNCTIONS**, (the battery has held sufficient charge during approximately two days transit) the battery meets requirements. No corrective action is to be taken. However, it is good practice to put the battery on charge for however long it is in your possession.

SCENARIO 2.a If the unit **DOES NOT FUNCTION** AND the battery **is IN warranty**, substitute a known-good-charged test battery. If the unit now functions, and Low Battery symbol disappears, REPLACE THE BATTERY UNDER WARRANTY. Install a fully charged PN72700 BATTERY. Recycle the failed battery per Welch Allyn's recycling procedure.

b If the unit **DOES NOT FUNCTION AND** the battery **is OUT of warranty,** substitute a known-good-charged test battery. If the unit now functions, sell a new battery. If the unit does not function, look for other problems while charging the customer's battery. Sell a new battery if customer's battery won't ACCEPT AND HOLD a full charge.


HOSE FROM RESONATOR TO PROBE TIP
PRESSURE TRANSDUCER
BACK HOUSING 236001-501
TUBING CONNECTOR (PRESSURE TRANSDUCER BOOT)
TRANSDUCER PAD 236044
2-56 X .25 PAN HD PHILLIPS SCREWS H2160
LOGO LABEL 236080
TOP CAP HOSE (TYGON TUBE) 236029-2
FLEX CIRCUIT 236262
BLACK TAB - ALSO ONE ON OTHER SIDE (ADHESIVE JOINTS)
PUMP UNIT
2-32 X .18 SLOTTED PAN HD (TOP CAP SCREW) 236006-2
SCREWS UNDER RESONATOR
FRONT HOUSING ASSY 236100-501N
RESONATOR 236168
BALLAST
RED WIRE AT "R"
BLACK WIRE AT "L"
VALVE CONTACTS ON VALVE PC BOARD
VALVE 236171-6N
BATTERY CONTACT (GND) 236242
BATTERY CONTACT (7.2V) 236241
SIDE CONTACT 230039
BATTERY COMPARTMENT ASSY 236172-501N
POWER JACK HOLDER ASSY 236112-502N
INSULATORS 236169
HANDLE PRINTED CIRCUIT BOARD (NOT FIELD REPAIRABLE)
3.6V BATTERY CONTACT 236167
SIDE CONTACT 230039
BLACK WIRE 236118-11
SCREWS HOLDING THE 3.6V CONTACT 236058
7.2V RECHARGEABLE BATTERY - BEIGE 72700
BATTERY COVER ASSY (W/ COVER, PAD AND LABEL) 236020-501
2-56 X .375 FL HD PHILLIPS SCREW 236081
DRESS NUT 230005 (HOLDING POWER JACK ASSY)
BOTTOM CONTACTS 236012-1
INSULATOR (236169) ASSEMBLED
INSULATOR (236169) ASSEMBLED
SIDE CONTACT 230039
SIDE CONTACT 230039

BACK VIEW

FIG 4

MAIN ASSY

Fig 4.1
pg 42.1

Section 4.1 Disassembly & Reassembly

Disassembly and Repair of the Handle

The repair 'TASK' procedures (R&R...Removal and Replacement) are written to provide quick and easy reference for different experience levels of repair technician. Required specifications and materials are listed at each step where applicable. For example:

Instructions will start off with a 'TASK, TO DO." For example – B.3. "Unplug Flex Circuit" statement. This will be followed by a "TECHNIQUE, HOW TO DO" statement. Follow these steps to perform the task. – "Grasp pump assembly flex circuit with pin straightening pliers."

NOTE: WEAR ESD WRIST STRAP WHILE PERFORMING THE FOLLOWING OPERATIONS.

B CIRCUIT BOARD:

B 1. REMOVE BATTERY COVER.
REMOVE THE SCREW THAT HOLDS THE BATTERY COVER ON.
REMOVE THE COVER.

B 2. REMOVE PATIENT SIDE HOUSING HALF.
REMOVE THE WELCH ALLYN LOGO LABEL LOCATED ON THE PATIENT SIDE BY **SLIDING** A PAIR OF TWEEZERS UNDER THE LABEL AND **LIFT** OFF OLD LABEL. **UNSCREW** TWO PHILLIPS HEAD SCREWS WITH A P12S XCELITE SCREWDRIVER OR EQUIVALENT.

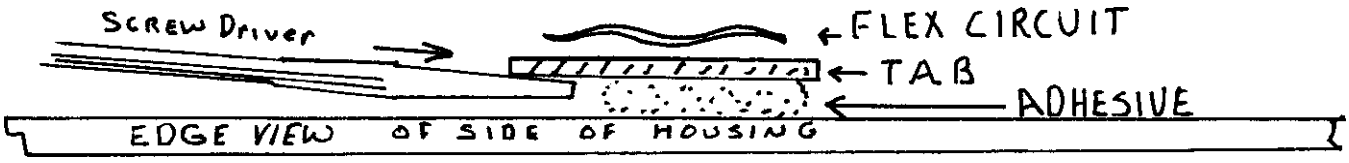
VERY IMPORTANT PROCEDURE...READ AND UNDERSTAND:

CAUTION: PERFORM THE FOLLOWING WITH CARE. CHECK FOR PULLING AND TEARING OF THE FLEX CIRCUIT AS YOU GENTLY REMOVE THE PATIENT SIDE COVER. AVOID HAVING TO REPLACE A FLEX CIRCUIT BY WORKING CAREFULLY.

TWO TABS (ONE ON EACH SIDE OF THE HOUSING) HAVE BLACK MAX ADHESIVE ON THEM TO HOLD THE PATIENT-SIDE HOUSING TIGHTLY TO THE HANDLE. TO BREAK THE BLACK MAX ADHESIVE BOND, **INSERT** THE TIP OF A 1/16" FLAT BLADE SCREWDRIVER INTO THE HANDLE **(SEE FIGURE. 4.2)** AND GENTLY **TWIST** THE SCREWDRIVER TO BREAK THE ADHESIVE BOND BETWEEN THE 2 TABS AND THE PATIENT SIDE HOUSING. DO NOT PRY CASES APART.

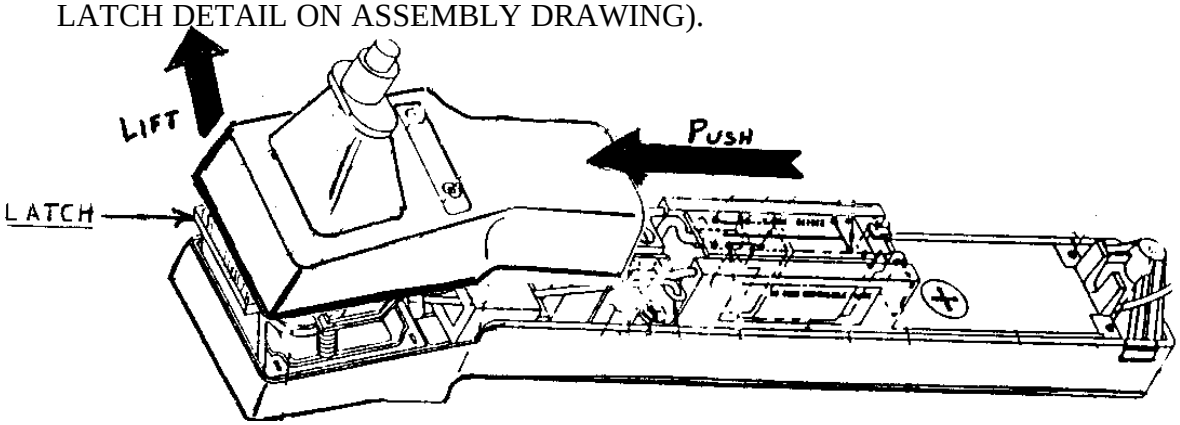
Section 4.1 Disassembly & Reassembly

Disassembly and Repair of the Handle



CAREFULLY INSERT SCREWDRIVER TIP BETWEEN TAB AND INSIDE OF THE CASE
FIGURE 4.2

SEE FIG. 4.3 BELOW. LAY THE HANDLE ON THE MAT WITH THE PRACTITIONER SIDE DOWN. **PRESS** WITH THE THUMB OF YOUR LEFT HAND AGAINST THE TOP OF THE INSTRUMENT (PRACTITIONER'S SIDE) WHILE GENTLY FORCING THE PATIENT SIDE COVER TOWARDS YOUR LEFT HAND. THIS WILL UN-LATCH THE TOP OF THE INSTRUMENT CASES. (SEE CASE LATCH DETAIL ON ASSEMBLY DRAWING).



LAY THE HANDLE DOWN AS SHOWN AND PRESS WITH LEFT THUMB AND PUSH AS SHOWN.
FIGURE 4.3

INSERT YOUR FINGER IN BETWEEN THE PUMP TOP PAD AND THE CASE TO SEPARATE THESE TWO ITEMS AS THIS WILL GREATLY EASE DISASSEMBLY. **CAREFULLY PULL** THE HOUSINGS APART AT THE TOP WHILE STOPPING FREQUENTLY TO VISUALLY **CHECK** THE FLEX CABLE.

B 3. REMOVE CIRCUIT BOARD ASSEMBLY.

CHECK TO SEE IF THE HOSE BETWEEN THE RESONATOR AND THE PROBE TIP WAS PINCHED BY THE HOUSING DURING PREVIOUS ASSEMBLY. IF THE HOSE WAS PINCHED, **WORK** THE KINK OUT SO THAT AIR CAN PASS THROUGH. (IF THIS MIGHT HAVE BEEN THE PROBLEM, **REASSEMBLE** BEING CAREFUL NOT TO KINK THE HOSE AND **TRY** THE UNIT.)

Section 4.1 Disassembly & Reassembly

Disassembly and Repair of the Handle

CONTINUED.....

BE VERY CAREFUL WHEN PULLING THE HOUSINGS APART SINCE THEY ARE JOINED TOGETHER BY BOTH THE HOSES AND THE FLEX CIRCUIT. WHEN THE HOUSINGS HAVE BEEN SEPARATED, SUPPORT THE FRONT HOUSING TO PROTECT THE FLEX CIRCUIT FROM STRESS AND POSSIBLE TEAR DAMAGE.

B 4. REMOVE CIRCUIT BOARD. REFER TO FIGURE 4.4 NEXT PAGE.

IF THE UNIT YOU ARE WORKING ON HAS THE OLD STYLE OF RESONATOR THAT OVERHANGS THE HEADS OF THE TOP TWO SCREWS, **PUT** THE SCREWDRIVER TIP IN AT AN ANGLE AND **UNSCREW** THEM (THEY WILL BE CAPTIVE SO YOU WON'T BE ABLE TO COMPLETELY REMOVE THEM.) **UNSCREW AND REMOVE** THE OTHER TWO SLOTTED HEAD SCREWS AT THE BOTTOM OF THE BATTERY COMPARTMENT. IF YOU HAVE THE NEWER STYLE OF RESONATOR WHERE THE TOPS OF THE SCREWS ARE ACCESSIBLE, **UNSCREW AND REMOVE** THE TWO SCREWS AT THE TOP OF THE BOARD. **REMOVE** THE NUT THAT IS HOLDING THE POWER JACK ASSEMBLY. THIS IS LOCATED ON THE BACK OF THE UNIT. **SLIDE** OFF THE 2 CHARGING CONTACTS FROM THE SIDES OF THE HOUSING AND **PULL** THE POWER JACK ASSEMBLY OUT. **REMOVE:**BATTERY COMPARTMENT, PCB AND PUMP FROM HOUSING.

NOTE: AFFECTING BOTH ORIGINAL PCB AND PCB+. SOME BOARDS HAVE 2 30 GA. WIRES ALONG SIDE THE BOARDS. THEY APPEAR TO HAVE BEEN CUT. THESE WERE TESTING WIRES DURING MANUFACTURING (PROCESS WIRES). REMOVE THEM..DO NOT SOLDER THEM TOGETHER.

C 1. REMOVE KEYPAD ASSEMBLY.

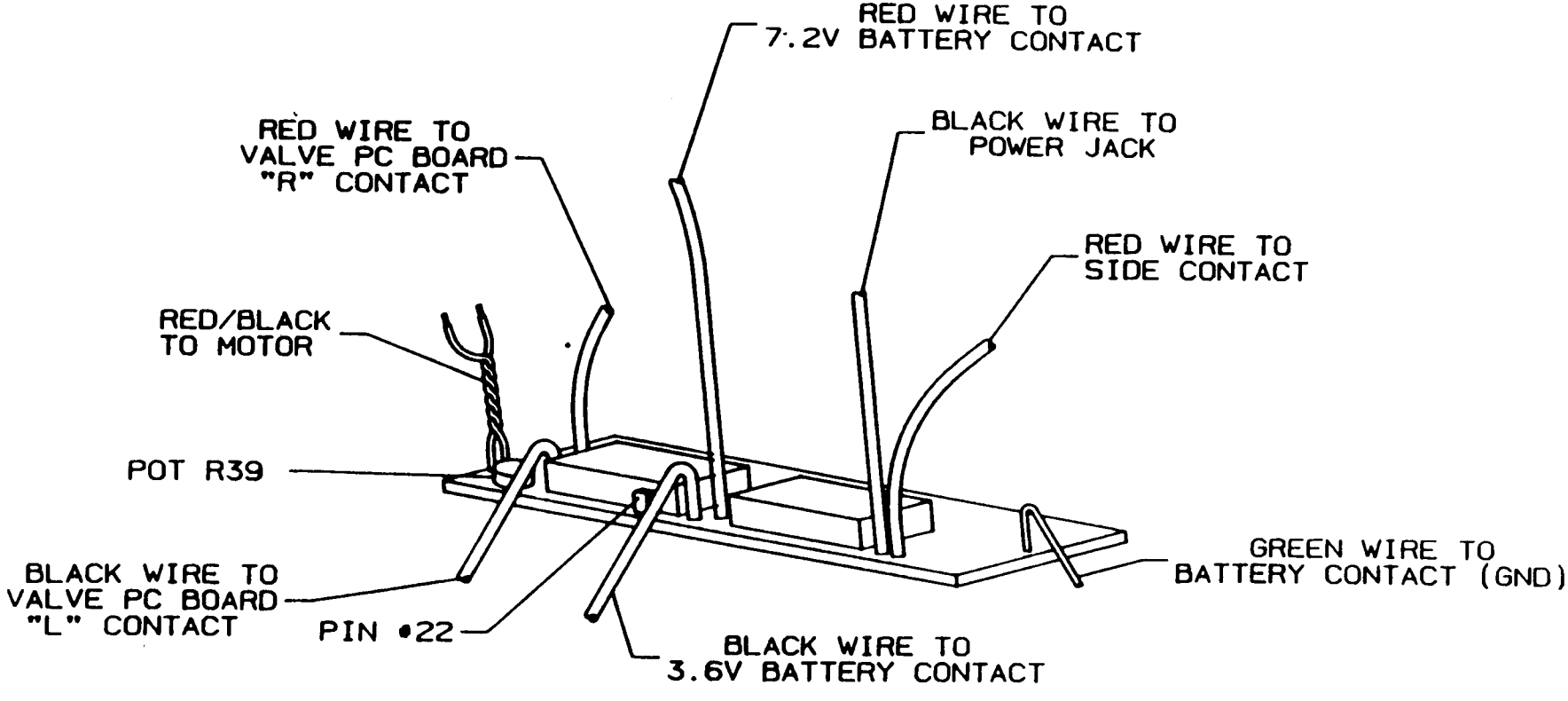
CAUTION:FLEX CIRCUIT IS SOLDERED TO KEYPAD BOARD AND LCD BOARD. REMOVE THE TWO SCREWS THAT HOLD THE TWO GRAY LCD MODULE SUPPORTS TO THE BACK HOUSING. **DO NOT LOSE** THE TWO SMALL SPRINGS WHEN LIFTING THE LCD MODULE SUPPORTS. THE FLEX CIRCUIT IS VERY SUSCEPTIBLE DURING THIS OPERATION. **PUSH** ON THE BUTTONS TO CAUSE THE KEYPAD ASSEMBLY TO COME LOOSE. TO CLEAN CONTACT TRACES ON THE BOARD, **GENTLY PULL** THE RUBBER BUTTONS AWAY FROM THE BOARD. THE CONTACT TRACES CAN BE CLEANED WITH SWAB DAMPENED IN ALCOHOL. AFTER CLEANING, **ATTACH** THE RUBBER KEYPAD TO THE BOARD BY **PUSHING** THE FOUR RUBBER PINS THROUGH THE BOARD WITH A BLUNT PIN. ONCE THEY ARE PARTLY THROUGH THE BOARD, **PULL** THEM THE REST OF THE WAY THROUGH WITH TWEEZERS. **DO NOT ALLOW** LCD DISPLAY TO FALL OUT OF THE BACK HOUSING DURING THIS PROCEDURE.

D 1. REMOVE POWER JACK ASSEMBLY. REFER TO FIGURE 4.5

REMOVE THE POWER JACK ASSEMBLY BY SLIDING OFF THE YELLOW AND WHITE WIRES WHICH ARE ATTACHED TO THE POWER JACK ASSEMBLY WITH SMALL SLIP ON CONNECTORS. **DON'T LOSE** THE SMALL BLACK INSULATOR DURING THIS STEP.

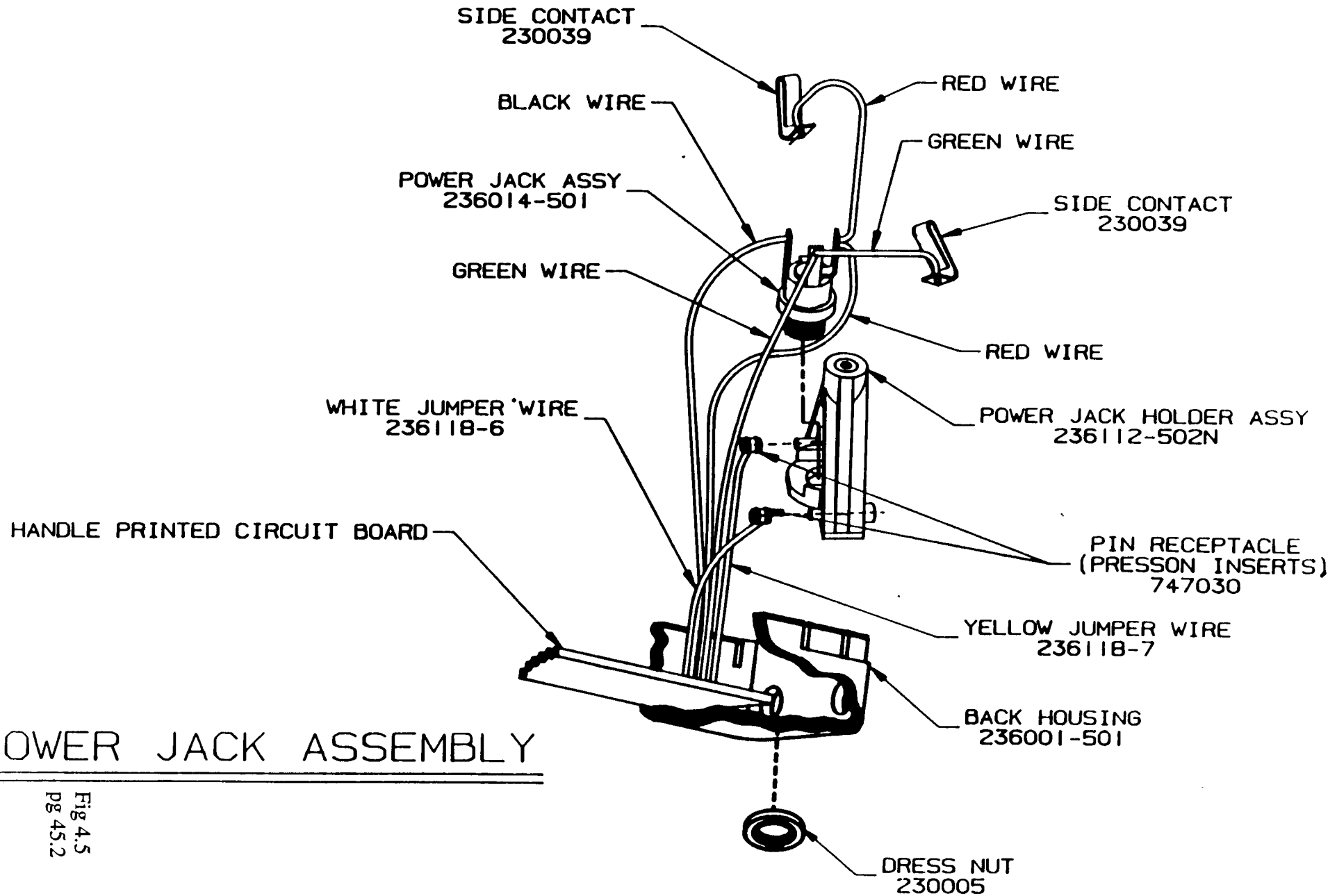
E 1. REMOVE VALVE FROM BOARD.

UNSOLDER AND STRAIGHTEN PINS AND REMOVE VALVE FROM UNDERNEATH THE BATTERY COMPARTMENT/BALLAST BOARD. **LIFT** VALVE FROM BOARD AND **DISCONNECT** TUBING FROM VALVE.



HANDLE PRINTED CIRCUIT BOARD

Fig 4.4
pg 45.1



POWER JACK ASSEMBLY

Fig 4.5
pg 45.2

Section 4.2 Disassembly & Reassembly

Reassembly and Repair of the Handle

F 1. REMOVE LCD ASSEMBLY.

REMOVE THE 2 SCREWS HOLDING DOWN THE HOUSING SUPPORTS. **PULL** THE LCD ASSEMBLY OUT OF THE BACK HOUSING. **DISASSEMBLE** THE LCD ASSEMBLY BY PUSHING IN ON THE TABS OF THE LCD FRAME AND PULLING OFF THE GRAY RETAINER.

REASSEMBLY OF THE HANDLE

G 1. RE-ASSEMBLE LCD.

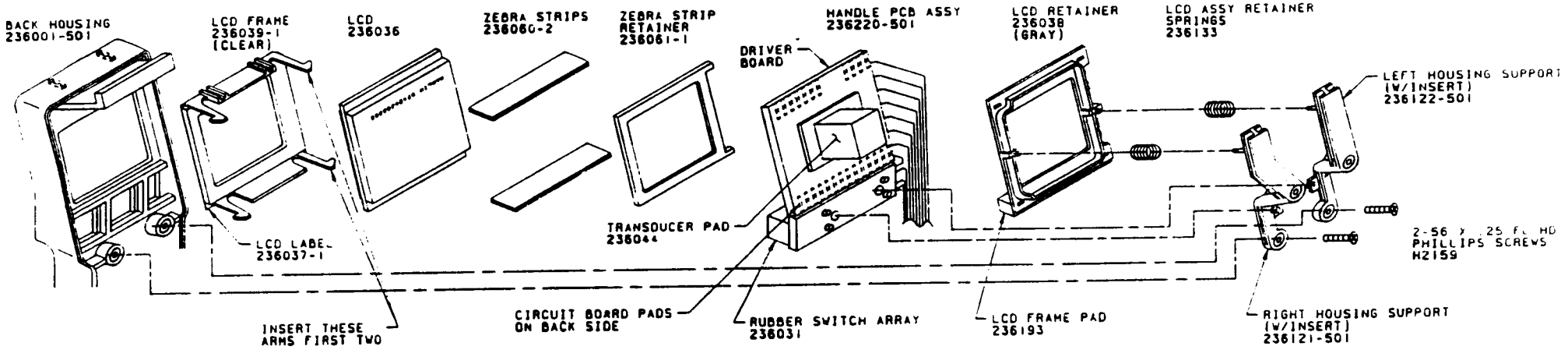
USE A SWAB DAMPENED WITH ISOPROPYL ALCOHOL TO **CLEAN** ZEBRA STRIPS, CIRCUIT BOARD PADS, AND THE LCD. **ALLOW** ALCOHOL TO EVAPORATE FOR ONE MINUTE. **PLACE** THE LCD INTO THE CLEAR LCD FRAME WITH PRINTING RIGHT-SIDE-UP ON BOTH PARTS. **PUT 2** ZEBRA STRIPS IN THE GROOVES OF THE LCD. **PLACE** ZEBRA STRIP RETAINER BETWEEN THE TWO ZEBRA STRIPS. **PLACE** THE SIDE WITH THE EXTENDED LEGS AS SHOWN IN FIGURE 4.6. **PLACE** THE DRIVER BOARD ON TOP OF THE ZEBRA STRIPS AS SHOWN. **PLACE** THE LCD RETAINER ON BY **INSERTING** THE TWO PLASTIC ARMS OF THE LCD FRAME INTO THE SLOTS OF LCD RETAINER FLEX SIDE FIRST. NEXT, **PUT** THE OTHER TWO PLASTIC ARMS IN THE SLOTS ONE AT A TIME TO PREVENT BREAKAGE. **PLACE** THE LCD ASSEMBLY AND THE RUBBER SWITCH ARRAY INTO THE FRONT HOUSING. **HOLD** THEM IN PLACE LONG ENOUGH TO SCREW DOWN THE TWO HOUSING SUPPORTS. **DO NOT FULLY TIGHTEN** THE SCREWS UNTIL YOU HAVE PLACED THE SPRINGS BETWEEN THE POSTS ON THE HOUSING SUPPORTS AND THE LCD RETAINER.

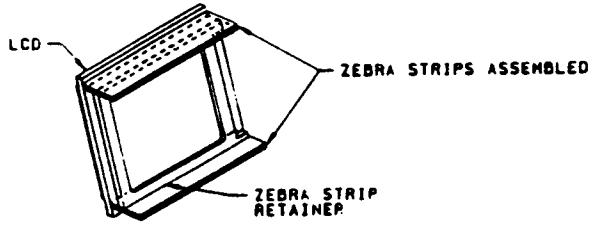
H 1. INSTALL KEYPAD ASSEMBLY.

INSERT KEYPAD ASSEMBLY INTO HOLES IN BACK HOUSING WITH SYMBOLS RIGHT SIDE ‘UP’. **ALIGN** THE FLEX SIDE RETAINER (STRAIGHT ARM) OVER THE LCD AND KEYPAD. **INSERT** SCREW AND START THE THREADS. WHILE IT IS STILL LOOSE, INSERT THE SPRING BETWEEN THE SMALL PIN POSTS. **TIGHTEN** SCREW AND DO THE SAME WITH THE OTHER RETAINER.

I 1. INSTALL REPLACEMENT VALVE.

ATTACH TUBING TO REPLACEMENT VALVE. **PREPARE** BOARD FOR RE-SOLDERING BY **REMOVING** EXCESS SOLDER AND **CLEARING** BOARD HOLES TO ACCEPT PINS OF REPLACEMENT VALVE. **INSERT** REPLACEMENT VALVE IN PLACE WITH THE TUBE-END TOWARDS THE ‘TEE’. **SOLDER** VALVE IN PLACE. **CLIP OFF** VALVE LEADS ABOVE SOLDER JOINTS.





LCD ASSY

Fig 4.6
Pg 46.1

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

J 1. INSTALL NEW MOTOR. REFER TO FIGURE 4.7 NEXT PAGE.

UNSOLDER THE RED AND BLACK MOTOR LEADS AT THE BOARD SIDE. **REMOVE** AND **DISCARD** THE OLD DRIVE BELT. **REMOVE** TWO MOTOR HOLDING SCREWS AND **REMOVE** THE OLD MOTOR. **PUT** A NEW MOTOR IN ITS PLACE AND **INSTALL AND TIGHTEN** THE TWO MOTOR HOLDING SCREWS. **USE** ISOPROPYL ALCOHOL ON A SWAB TO CLEAN THE BELT PULLEYS AND NEW BELT. **INSTALL** NEW BELT. **TWIST** THE WIRES TOGETHER AND **ROUTE** THEM AROUND THE RIGHT SIDE OF THE PUMP HOUSING. **SOLDER** THE RED WIRE MOTOR LEAD TO THE CIRCUIT BOARD HOLE WITH A + SYMBOL AND THE BLACK WIRE MOTOR LEAD TO THE HOLE TO THE LEFT OF IT. **TEST** FOR MOTOR OPERATION BY OPERATING THE MICROTYMP.

K 2. ADJUST SWEEP RATE FOR NEW MOTOR.

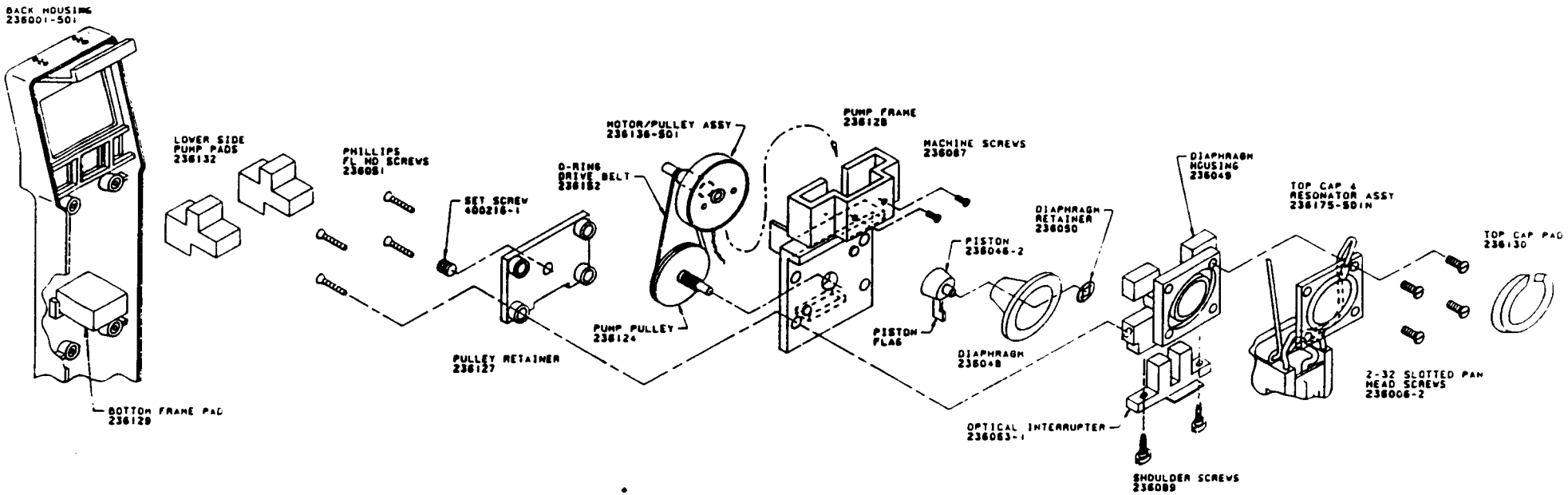
step 1 **LOOSEN** 4 SCREWS WHICH HOLD THE CIRCUIT BOARD AND BATTERY COMPARTMENT IN PLACE.

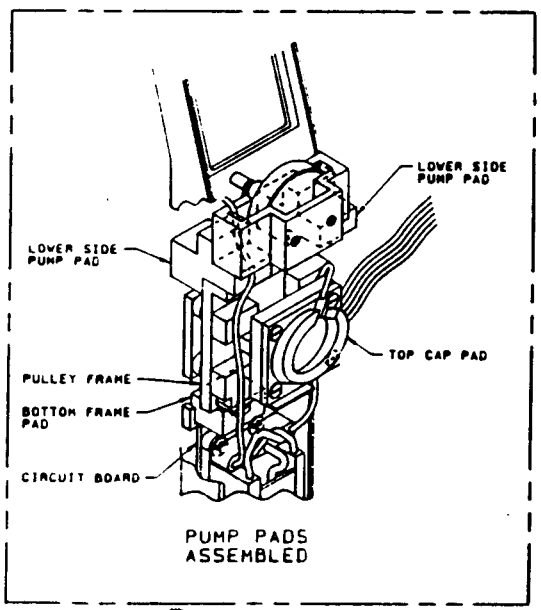
step 2 **CONNECT** THE UNIT UP TO THE CALIBRATOR AND **SET** SWITCH TO RUN MODE. SEE CALIBRATOR HOOK UP FIGURE 6.1 ON PAGE 6.1.

step 3 **ADJUST** DIGITAL STORAGE OSCILLOSCOPE TO 1 VOLT/DIV AND 5 SEC/DIVISION. **CONNECT** THE SCOPE TO THE WIRE SOLDERED TO PIN#22 OF THE MICROCOMPUTER AND GROUND.

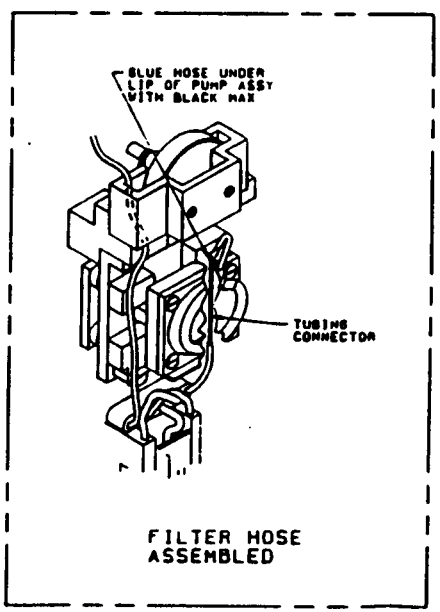
step 4 WITH THE CALIBRATOR N THE RUN MODE, **PRESS** THE SINGLE SWEEP BUTTON ON THE OSCILLOSCOPE, **ACTIVATE** THE MICROTYMP, AND **WAIT** FOR THE PULSE TO APPEAR ON THE SCREEN. **MEASURE** THE PULSE WIDTH FROM THE TOP TO THE BOTTOM OF THE PULSE. SEE FIG. 4.8 BELOW.

PULSE WIDTH FIGURE
FIGURE 4.8

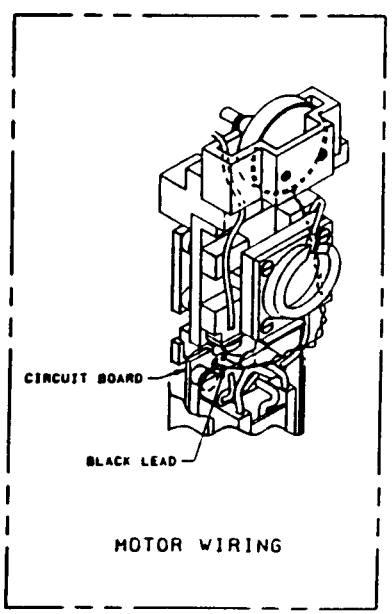




PUMP PADS
ASSEMBLED



FILTER HOSE
ASSEMBLED



MOTOR WIRING

MOTOR/PUMP ASSY

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

K 2. ADJUST SWEEP RATE FOR NEW MOTOR, CONTINUED.....

THE TIME SHOULD FALL BETWEEN 2.5 AND 2.6 SECONDS.
IF IT IS **LESS THAN 2.5 SECONDS,** , **ADJUST** POT R39 **COUNTER-CLOCK-WISE.** IF IT IS **GREATER THAN 2.6 SECONDS,** , **ADJUST** POT R39 **CLOCK-WISE. REPEAT** THIS PROCEDURE UNTIL THE SWEEP RATE FALLS WITHIN THE SPECIFIED RANGE AS STATED ABOVE.

NOTE: THE SIGNAL BEING MEASURED IS THE SIGNAL THAT CONTROLS THE MOTOR.

L 1. REPLACE THE DIAPHRAGM.

REMOVE THE FOUR SCREWS IN THE PULLEY RETAINER ON THE BOTTOM OF THE PUMP ASSEMBLY. **REMOVE** THE BELT AND UNSCREW THE PULLEY PUMP. THE PISTON ASSEMBLY CAN BE PULLED OUT THROUGH THE BOT-TOM. **PUT** IN A NEW ASSEMBLY. **CLEAN** THE PULLEY AND REPLACEMENT BELT WITH ISOPROPYL ALCOHOL ON A SWAB. **SCREW** IN THE PULLEY, **PUT** ON A NEW BELT (**USE** FINGER COTS TO KEEP FINGER OILS FROM CON-TAMINATING THE BELT OR PULLEYS.) **TIGHTEN** THE FOUR SCREWS IN THE PUMP FRAME.

IMPORTANT NOTE

USE THIS REPAIR ON UNITS THAT THE PISTON/PULLEY THREADS BECOME EASILY DISENGAGED. (PISTON GETS STUCK AT TOP OF STROKE AND WILL NOT 'HOME'. THE VINTAGES THAT WERE PRONE TO THIS PROBLEM ARE SERIAL NUMBERS 13,000 TO 15,000 RANGE. THIS IS AN APPROXIMATION.
PROBLEM: PUMP PISTONS MAY GET STUCK AT THE TOP OF THEIR TRAVEL LIM-ITS AND FAIL TO RETURN TO "HOME" POSITION. WHEN THE MICROTYMP I IS TURNED ON, THE PISTON LIFTS TOWARDS THE TOP-CAP. IF IT CAN'T LOWER, THE UNIT CLICKS ONE TIME, THEN SHUTS DOWN. THE LCD WILL DISPLAY A NON-FLASHING OPEN SYMBOL, OR POSSIBLY A NON-FLASHING LEAK SYMBOL. IN BOTH CASES THE MICROTYMP WILL BECOME INOPERATIVE. THE REASON IT MIGHT NOT BE ABLE TO LOWER IS THAT THE THREADS OF THE PULLEY BECOME DISENGAGED FROM THE PISTON AT THE TOP OF THE STROKE. THE CAUSE OF THIS IS THAT SOME LOTS OF DIAPHRAGMS HAD A TENDENCY TO SPRING AWAY (MEMORY) AT THE TOP OF THE STROKE, THIS MEMORY DOES NOT ALLOW THE PISTON TO STAY THREADED TO THE PULLEY. INSTEAD, IT PULLS AWAY.

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

L 1. REPLACE DIAPHRAGM CONTINUED.....

PROBLEM DETECTION: THE PUMP PISTON CAN BE POSITIONED AT THE TOP OF ITS STROKE BY PUSHING THE “UP” BUTTON ON THE MICROTYMP CALIBRATOR WHEN IT IS SET ON THE ‘CALIBRATE’ MODE. HOLD THE “UP” BUTTON UNTIL THE PISTON STARTS RATCHETING, CLICKING (SLIPPING) ON THE TOP OF THE PULLEY THREADS. THIS IS ACCEPTABLE. AFTER YOU ARE SURE THE PISTON HAS REACHED THE TOP, RELEASE THE “UP” BUTTON, AND PUSH THE “DOWN” BUTTON. THE PISTON SHOULD TRAVEL DOWN WITHOUT DELAY. HOWEVER, IF IT DOES NOT RESPOND THIS WAY, IT IS AN INDICATION THAT THE PUMP DIAPHRAGM/PISTON HAS BECOME DISENGAGED FROM THE TOP OF THE PULLEY THREADS. THEREFORE A SIMPLE FIX, DESCRIBED BELOW, IS RECOMMENDED. **TO OBTAIN A FOAM PAD, CONTACT THE TECHNICAL SERVICE DEPARTMENT AT WELCH ALLYN. PHONE NUMBERS ARE LISTED ON PAGES 1.1 AND 1.2.**

L 2. INSTALL FOAM PAD. REFER TO FIGURE 4.9 BELOW.

DISASSEMBLE THE PUMP AS DESCRIBED ABOVE. **INSPECT** THE FOAM PAD AND THE HOUSINGS FOR ANY PARTICLES OR DEBRIS. THIS COULD CAUSE CLOGGING OF THE TUBING. **POSITION** THE SELF-STICK FOAM PAD IN THE CENTER OF THE UNDERSIDE OF THE TOP CAP ASSEMBLY.

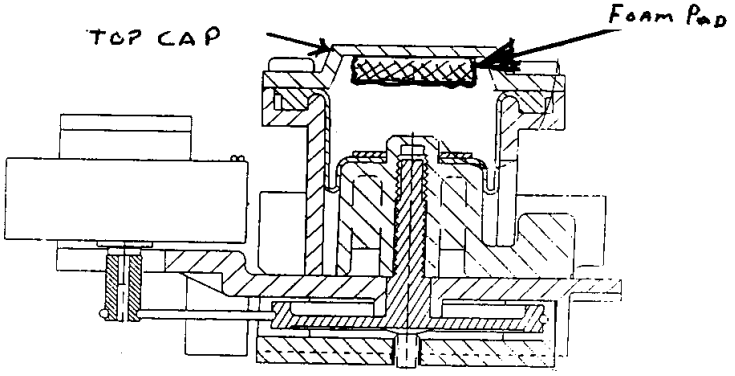


FIGURE 4.9 - POSITION OF FOAM PAD IN TOP CAP OF PUMP

L 3. REASSEMBLE THE PUMP.

REPOSITION THE DIAPHRAGM BY **TURNING** THE PULLEY CLOCKWISE UNTIL THE FLAG IS AT THE TOP OF THE PUMP HOUSING. THIS CAN BE DONE BY USING A STRAIGHT SCREWDRIVER. GENTLY **INSERT** THE DIAPHRAGM PLACEMENT TOOL T-5734 INSIDE THE DIAPHRAGM AND **PUSH** STRAIGHT DOWN UNTIL THE LIP OF THE DIAPHRAGM LIES FLAT IN THE GROOVE OF THE HOUSING. **HOLD** DOWN THE DIAPHRAGM SO IT DOESN’T POP OUT. **REMOVE** THE T-5734 DIAPHRAGM TOOL. **POSITION** THE FLAG IN THE MIDDLE OF THE SLOT AND **PUT** THE TOP CAP ON. **MAKE SURE** THE FLAG REMAINS CENTERED. **TIGHTEN** THE FOUR SCREWS AND THEN **CHECK** OPERATION OF PUMP.

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

M 1. ASSEMBLE BATTERY COMPARTMENT.

SOLDER THE WIRES ONTO THE VALVE BOARD (RED TO **R**, AND BLACK TO **L**). **PUT** THE BATTERY CONTACTS IN PLACE AND GLUE THEM WITH BLACK MAX ADHESIVE. (RED WIRE TOT THE +7.2 SIDE AND BLACK WIRE TO THE GROUND SIDE.) **DO NOT APPLY** ANY ADHESIVE ON THE FACE OF THE TAB THAT ACTUALLY TOUCHES THE BATTERY.

NOTE: ONCE THE UNIT IS ASSEMBLED, ADMITTANCE CALIBRATION MUST BE CHECKED USING THE 1.9 CC AND .5 CC QUICK CHECK CAVITIES LOCATED IN THE SIDE OF THE MICRO TYMP PRINTER/CHARGER AND A 1 CC CAVITY.

N 1.RE-ATTACH TUBING.

GLUE THE FILTER HOSE UNDER LIP OF THE PUMP ASSEMBLY WITH BLACK MAX ADHESIVE. **APPLY** A SMALL AMOUNT OF G.E. 108 RTV M-30313 AROUND THE END OF THE FILTER HOSE AND **PUSH** IT INTO THE PRESSURE TRANSDUCER BOOT. **CAUTION: DO NOT ALLOW RTV TO ENTER THE TUBE OR A BLOCKAGE WILL OCCUR.**

O 1. INSTALL THE POWER JACK ASSEMBLY.

PLACE THE POWER JACK ASSEMBLY INTO THE HOUSING FIRST. THE WIRING HARNESS SLIPS INTO THE POWER JACK HOLDER. WITH THE PATIENT SIDE UP AND VIEWING THE POWER JACK ASSEMBLY FROM THE BOTTOM OF THE HANDLE, **CONNECT** WIRES AS FOLLOWS:

WHITE WIRE TO **LEFT PIN**
YELLOW WIRE TO **RIGHT PIN**

P 1. PLACE COMPONENTS INTO THE HANDLE HOUSING.

THE POWER JACK ASSEMBLY, PRINTED CIRCUIT BOARD, BATTERY COMPARTMENT AND PUMP ARE PLACED BACK INTO THE HOUSING AT THE SAME TIME. PUT THE POWER JACK ASSEMBLY IN SO THAT THE DATA CONTACTS SLIDE INTO THE TWO HOLES ON THE BOTTOM OF THE HOUSING. **INSERT** THE POWER JACK INTO THE HOLE IN THE BACK HOUSING AND **SECURE** WITH DRESS NUT. SLIDE THE CHARGING CONTACTS ONTO THE HOUSING.

P 2. SECURE PCB.

TIGHTEN THE TWO SCREWS LOCATED UNDERNEATH THE RESONATOR. NEXT, TIGHTEN THE TWO SCREWS* THAT HOLD THE 3.6 VOLT BATTERY CONTACT IN PLACE. * (THESE TWO SCREWS ALSO HOLD THE: INSULATORS, BATTERY COMPARTMENT, AND PRINTED CIRCUIT BOARD TO THE MOLDED INSERTS IN THE BACK HOUSING.)

CAUTION: BEFORE TIGHTENING THESE SCREWS, MAKE SURE THE TWO SMALL BLACK PLASTIC INSULATORS ARE COVERING THE SIDE CHARGING CONTACTS. THEY PREVENT THE BATTERY CONTACT FROM TOUCHING THE CHARGING CONTACTS.

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

P 3. PUT PUMP INTO HOUSING.

WHEN PUTTING THE PUMP INTO HOUSING, MAKE SURE ALL FOUR PUMP PADS ARE POSITIONED PROPERLY. THE FIRST WILL BE ON THE TOP CAP ASSEMBLY. (SOMETIMES IT WILL STICK TO THE UNDERSIDE OF THE FRONT HOUSING PATIENT SIDE). LOOK FOR IT THERE IF IT NOT ON THE TOP OF THE TOP CAP. TWO SMALLER PADS WILL BE LOCATED AT THE FRONT OF THE PUMP ON BOTH SIDES OF THE MOTOR. THE FOURTH PAD IS ON THE BOTTOM OF THE INSIDE BACK HOUSING. WHEN PUTTING THE PUMP BACK INTO THE HOUSING, MAKE SURE THAT THIS FOURTH PAD IS BETWEEN THE FLEX CIRCUIT AND THE BACK OF THE PUMP. BE SURE THAT THE OTHER PADS STAY IN PLACE WHEN PUTTING THE PUMP BACK INTO THE HOUSING.

Q 1. ATTACH FRONT HOUSING (PATIENT SIDE HOUSING).

WRAP THE HOSE AROUND THE PAD ON THE PRESSURE TRANSDUCER UNTIL THERE IS NO SLACK IN THE LINE WHEN THE HOUSING IS ALMOST COMPLETELY CLOSED. **PUT** THE HOUSING IN PLACE MAKING SURE NOT TO PINCH THE HOSE. **TIGHTEN** THE TWO SCREWS. **CHECK** THE HOUSINGS TO MAKE SURE THEY ARE MATED UNIFORMLY AROUND ALL EDGES. **WIPE** THE MOUNTING AREA FOR THE LABEL WITH A SWAB DAMPENED WITH ISOPROPYL ALCOHOL. **WAIT** APPROXIMATELY ONE MINUTE FOR THE ALCOHOL TO EVAPORATE. **ATTACH** A NEW WELCH ALLYN LABEL.

R 1. SECURE HOUSINGS TOGETHER WITH LOCTITE BLACK MAX.

CAUTION WHEN USING ADHESIVES:

ALWAYS WEAR SAFETY GLASSES AND PROVIDE ADEQUATE VENTILATION WHEN USING ADHESIVES OR ACCELERATORS. READ THE MSDS SHEET BEFORE USING THESE MATERIALS. COMPLY WITH ALL SAFETY PROCEDURES WHILE USING THESE MATERIALS. BE CAREFUL NOT TO GET BLACK MAX BETWEEN THE FLEX CIRCUIT AND THE TAB. ALSO DO NOT GET IT INTO THE GROOVE THAT THE BATTERY COVER SITS IN OR ON THE EXTERIOR SURFACES OF THE MICROTYMP.

USE A SMALL APPLICATOR TIP ON THE END OF THE BLACK MAX BOTTLE. **APPLY** A SMALL DOT ON THE SURFACE OF THE BLACK TAB THAT FACES THE INSIDE OF THE HOUSING. **DO THIS** TO THE LEFT SIDE AND RIGHT SIDE OF THE MICROTYMP. **APPLY** A DROP OF ACCELERATOR ON THE BLACK MAX WHILE **PRESSING** THE HOUSINGS TOGETHER. **HOLD** FOR ONE MINUTE TO ALLOW THE BLACK MAX TO FULLY CURE.

Section 4.2 Disassembly & Reassembly

Re-assembly and Repair of the Handle

S 1. INSERT BATTERY.

MATCH THE BATTERY POSITIVE TO THE + LABEL IN THE BATTERY COMPARTMENT. **PUT** COVER ON AND **SECURE** WITH SCREW. **CHECK** THE MICROTYMP BY OBTAINING A TYMPANOGRAM OF THE QUICK CHECK CAVITIES LOCATED IN THE PRINTER CHARGER STAND.

T 1. FUNCTIONAL TEST.

PERFORM A TYMP ON THE ARTIFICIAL EAR OR TEST-CAVITY. NOTE THAT ALL BUTTONS SHOULD OPERATE SMOOTHLY AND FREELY. **VERIFY** THAT MEMORY STORAGE IS GOOD BY PRESSING THE LEFT EAR STORE BUTTON AND THEN THE RIGHT EAR STORE BUTTON. **VERIFY** MEMORY RECALL. **PRESS** THE LEFT EAR STORE BUTTON AGAIN. THE INFORMATION STORED IS THE FIRST STEP SHOULD BE SHOWN ON THE LCD. **REPEAT** THIS RECALL TEST FOR THE RIGHT EAR. **VERIFY** MEMORY ERASURE. **PRESS AND HOLD** THE LEFT EAR BUTTON. MEMORY SHALL BE ERASED AND THE BLANK MEMORY SYMBOL SHALL BE DISPLAYED BETWEEN 2.7 AND 3.3 SECONDS.

PRINTER COMMUNICATIONS TEST:
TAKE A TYMP OF AN ARTIFICIAL EAR OR TEST CAVITY AND STORE THE TYMPANOGRAM INTO THE LEFT AND RIGHT EAR MEMORY.
PLACE THE MICRO TYMP HANDLE INTO **YOUR "KNOWN GOOD"** PRINTER CHARGER.
THE RED LED SHOULD ILLUMINATE IMMEDIATELY WITHOUT FLICKER. WHEN THE PRINT BUTTON IS PRESSED, THE TYMPANOGRAM STORED IN THE LEFT AN RIGHT EAR MEMORY SHOULD BE PRINTED ONTO THE PAPER. IF "NO HANDLE" OR "NO DATA" IS PRINTED, THEN THE UNIT FAILS THIS TEST.

END OF REASSEMBLY SECTION.

Section 5.1 Disassembly & Reassembly

Disassembly and Repair, Printer Charger

CAUTION: PRIOR TO DOING REPAIR WORK, UNPLUG POWER CORD, USE GROUNDING MAT AND GROUNDING STRAP TO MINIMIZE SHOCK HAZARD AND REDUCE CHANCES OF DAMAGE TO SENSITIVE ELECTRONIC COMPONENTS. (6 CMOS IN HANDLE AND 1 CMOS IN PRINTER CHARGER)

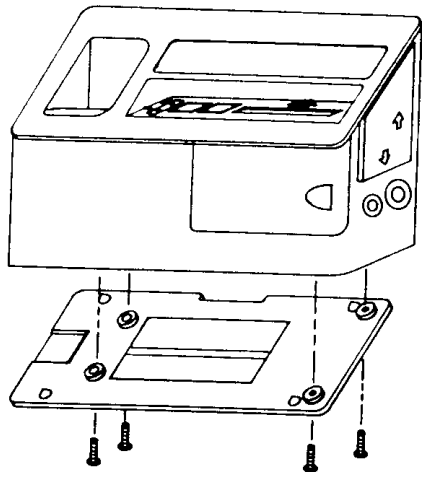


FIG. 5-1 OVERVIEW OF DISASSEMBLY

A REMOVE CIRCUIT BOARDS.

LAY UNIT ON ITS BACK AND **UNSCREW** 4 SCREWS FROM THE BOTTOM OF THE PRINTER CHARGER. **REMOVE** BOTTOM PLATE. SEE FIG. 5-1 ABOVE.

A 2. REMOVE TOP HOUSING.

UNSCREW 3 SCREWS (SEE FIGURE BELOW) VISIBLE THROUGH OBLONG SLOT. THESE HOLD THE TOP HOUSING TO THE PRINTER BOARD. **UNSCREW** THE SCREW HOLDING THE WIRE TO THE TOP HOUSING ASSEMBLY. **PULL** THE TOP HOUSING STRAIGHT UP.

NOTE: **ALL STANDS BUILT PRIOR TO MARCH 1988** (SEE THE DATE ON THE BOTTOM OF THE PRINTER / CHARGER), MUST HAVE THE TOP HOUSING ASSEMBLY REPLACED WITH THE NEW ASSEMBLY (#711605-501), WHICH PREVENTS ELECTRO STATIC DISCHARGE DAMAGE.

Section 5.1 Disassembly & Reassembly

Re-assembly and Repair, Printer Charger

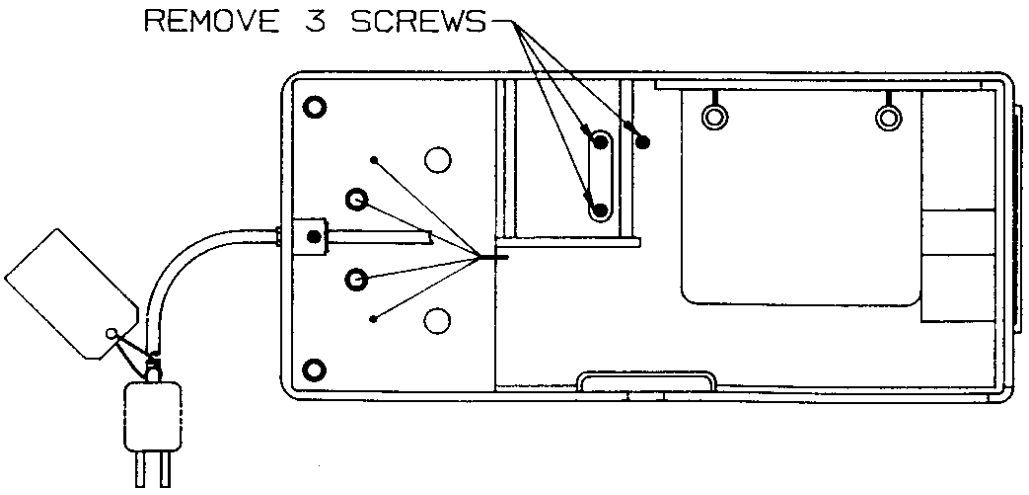


FIG. 5-2 REMOVING 3 TOP HOUSING HOLDING SCREWS

A 3. REMOVE CIRCUIT BOARDS FROM THE HOUSING.

CUT WIRE TIE AROUND TRANSFORMER. **LOOSEN** TERMINAL BLOCK SCREWS THAT HOLD THE BLACK,WHITE OR BLUE,BROWN WIRES. **REMOVE** GREEN WIRE:

A) US AND CANADA MODEL...**UNSCREW** SCREW HOLDING THE WIRE ONTO THE TRANSFORMER.

B) AUSTRALIA, EUROPE, JAPAN, UNITED KINGDOM...**LOOSEN** TERMINAL BLOCK SCREW HOLDING THE GREEN/YELLOW WIRE.

PULL OUT THE FOUR PIN WIRE JACK THAT CONNECTS TO THE POWER SUPPLY BOARD. (THIS JACK CONTAINS RED, BLACK BLUE, AND YELLOW WIRES). **REMOVE** ANY ADHESIVE THAT MAY BE HOLDING THIS JACK TO THE BOARD. **REMOVE** THE PAPER IN THE PRINTER BY CUTTING IT FROM ROLL. **PULL** IT IN THE DIRECTION OF THE NORMAL PAPER FEED. **DO NOT PULL PAPER OPPOSITE TO NORMAL PAPER FEED PATH. PULL** BOARDS STRAIGHT OUT OF HOUSING.

A 4. SEPARATE THE CIRCUIT BOARDS.

REMOVE THE TWO SCREWS HOLDING THE BOARDS TOGETHER AT THE 20 PIN CONNECTOR. IF THERE IS ADHESIVE ON THE SCREW THREADS, LOOSEN IT BY **HEATING** THE EXPOSED THREADS OF THE SCREWS EXTENDING THROUGH THE PEM NUTS ON BACK SIDE OF BOARD. **REMOVE** SCREWS AND SPACERS.

PULL THE 20 PIN CONNECTOR OUT OF THE FEMALE CONNECTOR AND **SEPARATE** BOARDS.

END DISASSEMBLY OF PRINTER CHARGER

Section 5.2 Disassembly & Reassembly

Re-assembly and Repair, Printer Charger

B 1. REPLACE CIRCUIT BOARDS INTO HOUSING.

CONNECT THE 20 PIN MALE CONNECTOR ON THE PRINTER BOARD INTO THE 20 PIN FEMALE CONNECTOR ON THE POWER SUPPLY BOARD.
ATTACH THE TWO BOARDS TOGETHER USING TWO SCREWS, SPACERS.
POSITION SPACERS BETWEEN THE MALE CONNECTOR AND THE POWER SUPPLY BOARD. **APPLY** A BEAD OF RTV 108 (THICK CLEAR) M-30313, TO THE EXPOSED THREADS OF THE TWO SCREWS PROTRUDING FROM THE PEM NUTS ON THE BACK OF THE POWER SUPPLY BOARD.

B 2. PUT BOARDS INTO HOUSING.

CONNECT THE 4 PIN MALE WIRE JACK TO THE BOARD (FROM THE DATA AND CHARGING CONTACTS, CONTAINS THE RED, BLUE, BLACK AND YELLOW WIRES). **PLACE** THE WIRES UNDER CAPACITOR C1.

B 3. FASTEN WIRES.

FASTEN THE BLACK AND WHITE OR BLUE AND BROWN WIRES SECURELY INTO THE TERMINAL BLOCK.. FASTEN THE GREEN WIRE.
ON US AND CANADIAN VERSIONS, TIGHTEN THE SCREW THAT HOLDS THE GROUND WIRE ONTO THE TRANSFORMER AND THE GROUND WIRE FROM THE TOP HOUSING OPPOSITE SCREWS.
ON AUSTRALIA, EUROPE, JAPAN AND UNITED KINGDOM UNITS, **FASTEN** THE GREEN/YELLOW WIRE SECURELY INTO THE TERMINAL BLOCK, AND THE GROUND WIRE FROM THE TOP HOUSING TO THE TRANSFORMER.

B 4. ROUTE WIRES.

INSTALL WIRE TIE (SMOOTH SIDE FACING OUT) AROUND TRANSFORMER AND THE HOUSING. **PULL** IT TIGHT WITH A PAIR OF PLIERS AND **CUT** OFF EXCESS.

B 5. INSPECT.

CHECK TO BE SURE THE FLEX STRIP IS PUSHED DOWN TIGHTLY INTO HTE 9-PIN CONNECTOR.

C 1. REPLACE TOP HOUSING.

REPLACE 3 SCREWS THAT HOLD THE TOP HOUSING TO THE PRINTER BOARD. **TIGHTEN** SCREWS. TWO BOSSES ARE LOCATED UP THROUGH THE SLOT OF THE BOTTOM HOUSING, THE THIRD IS TO THE RIGHT OF THE SLOT.

C 2. REPLACE BOTTOM PLATE.

INSTALL AND **TIGHTEN** THE 4 SCREWS THAT HOLD THE BOTTOM PLATE IN PLACE.

D 1. TEST PRINTER/CHARGER.

PERFORM FULL FUNCTIONAL TESTS ON PRINTER/CHARGER.

END PRINTER/CHARGER REASSEMBLY

Section 6.1 Calibrator Testing

Procedure for testing MT1 Calibrator Box

A- *ELECTRICAL CONNECTIONS* *Check that all pins make good electrical contact.*

1. **Place** MicroTymp 1 in holding fixture T-5609. **Set** Box power switch to **"OFF".**
2. **Connect BLACK 7.2** volt power supply lead to + battery contact. fig 6-1
3. **Connect RED 3.6** volt power supply lead to long contact (back end of MT 1.)
4. **Connect GREEN *Ground*** lead to side contact on T-5609.
5. **Connect WHITE *CTS*** lead to 'Pogo Pin' ring terminal **"CTS"** contact.
6. **Connect BROWN *DATA*** lead to 'Pogo Pin' ring terminal **"DATA"** contact.

B- *TEST PROCEDURE*

1. **Set** power switch of Box to **"ON"** position.
2. **Set** 'Calibrate/Run' switch to '**CALIBRATE**' position. Hexadecimal numbers for Pressure (center number), and Volume (right number) will appear on panel meter. 'Period' value used for Fast Clock (left number) will also appear. (Seconds or parts of seconds are not used for this readout.)
3. **Put** a 2 CC cavity onto the MicroTymp 1 probe tip. Desired values and tolerances in counts, will be displayed on meter per Fig. 2 below:
   Fast Clock = **0435 +/-20,** Pressure = **89 +/- 5,** Volume = **9A +/- 5**

(left) period for fast clock	*(center)* pressure	*(right)* volume
0435	PR:89	VL:9A

Fig.2 **Panel Meter Display**

4. **Depress** "UP" button on the Calibrator Box. The pressure (center) readout will increase to approximately **BD to C6.** Display increases at even rate.
5. **Depress** "DOWN" button on the Calibrator Box. The pressure readout will decrease to approximately **3C to 44.** Display decreases at even rate.
6. **Set** "Calibrate/Run" switch to **"RUN" for 1 second then to "CALIBRATE".**
   The pressure readout will be at **89 +/- 5 counts.**
7. **Remove** the 2 CC cavity from the MicroTymp 1 probe tip. The volume (right) readout will increase to approximately **EA +/- 5 counts.**
8. **Set** "Calibrate/Run" switch to **"RUN"** position. After several seconds, the volume (right) readout will be **"INSTALL UNIT".**
9. Test is over. **Set** power switch to **"OFF"** position and **disconnect** all leads.

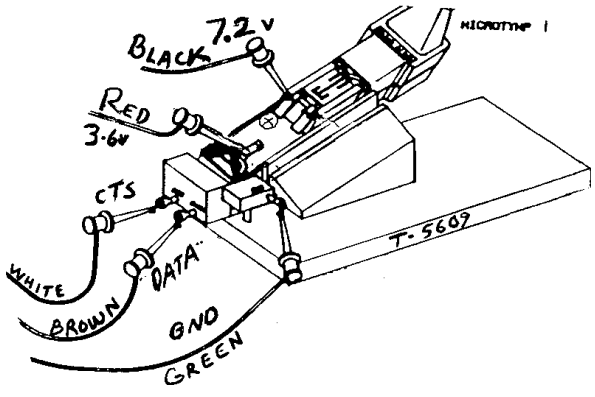


Fig.6.1 **Hook-Ups**

Section 6.2 List of drawings

LISTING OF DRAWINGS AND A-SPECS.

DRAWING #:	NUMBER OF SHEETS:	
236253	57	Service manual text
236000	2	
236011	1	
236116	2	
236219	1	
236219	1	Annotated
236220	2	
236250	1	High altitude information page
A-SPEC #:		
A-00848	2	
A-00849	2	
A-01745		
A-01785	1	
A-01862	1	High altitude modifications

END

Micro Tymp
Tympanometric System

23600 handle, 71130 printer charger

Copyright 1995
Welch Allyn Co.

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	REL TO PROD ENG	5-1531	CRW	6/22/87	AJK
B	REV'D NOTES 6 & 7; ADD'D ** NOTE	5-1700	CRW	4/27/88	

ANVIL 1000
FILE NAME: A01745B1
LEVEL 10 NOTES
LEVEL 1021 BORDER
LEVEL 1022 TEXT NODES
LEVEL 1023 FORMAT

1. TEST CONDITIONS – UNLESS OTHERWISE SPECIFIED, THE FOLLOWING TEST CONDITIONS APPLY:

   A. AMBIENT TEMPERATURE 20°–30 A. AMBIENT TEMPERATURE 20° C

   B. +7.2 V.D.C., +3.6 V.D.C. AND NEG CONNECTED TO A REGULATED POWER SUPPLY (SEE 236065 FOR CONNECTIONS) ±.05V

   C. WELCH ALLYN CALIBRATION FIXTURE NUMBER T3281 (DWG NUMBER 40500005), OR EQUIVALENT, CONNECTED TO UNIT UNDER TEST AS SHOWN IN A00841. CALIBRATOR IS IN "RUN" MODE.

   D. "PRESS" AND "COMP" ARE USED TO INDICATE THE DIGITAL OUTPUT OF THE CALIBRATOR (IN HEXADECIMAL FORMAT) FOR THE PRESSURE AND COMPLIANCE SIGNALS RESPECTIVELY.

   E. ANY LCD INDICATIONS SHALL BE FLICKER–FREE AND HAVE UNIFORM, ADEQUATE CONTRAST.

   F. FOR ALL SOUND LEVEL MEASUREMENTS, AMBIENT NOISE SHALL BE AT LEAST 10 dB BELOW THE SIGNAL OF INTEREST.

2. CURRENT DRAIN – SHALL NOT EXCEED THE LIMITS LISTED BELOW:

POWER SUPPLY	CURRENT DRAIN	START/RUN BUTTON
+3.6V	5–20uA	OPEN ("OFF" MODE)
+7.2V	10–60uA	OPEN ("OFF" MODE)
+7.2V	70mA	ACTUATED *

   * DURING PRESSURIZATION AND SWEEP PERIODS, EXCLUDING START, STOP AND REVERSAL TRANSIENTS

3. PNEUMATIC SEAL – WITH THE VALVE CLOSED VIA THE CALIBRATOR, APPLY PRESSURES OF +300 AND –300 daPa TO THE PROBE TIP. THE LEAK RATE SHALL BE LESS THAN 3 daPa/second AVERAGED OVER A 5.0 SECOND PERIOD.

4. FAST CLOCK SHALL BE 412–452. IF NOT, SET IN USING C3.

5. FREQUENCY – THE PROBE TONE FREQUENCY SHALL BE 219–233 Hz.

** 6. SOUND LEVEL – THE UNIT IS COUPLED TO A SOUND LEVEL METER VIA AN ANSI HA–1, 2.0 cc COUPLER AND A 1.0 INCH MICROPHONE. CARE SHOULD BE TAKEN TO ASSURE AN ACOUSTIC SEAL BETWEEN ALL ELEMENTS. THE SOUND LEVEL METER SHALL MEASURE ABSOLUTE SOUND PRESSURE LEVEL WITH RESPECT TO 20uPa AND SHALL BE EQUIPPED WITH A 1/3 OCTAVE BAND FILTER HAVING A CENTER FREQUENCY OF 250 Hz. THE PROBE TONE SHALL READ 85±2 dB.
   IF NOT – ORIGINAL PCB: OPEN S1, APPLY +3.00 V.D.C. TO TP2, AND SET PROBE TONE TO 84.5 – 85.5 dB BY ADJUSTING R24.
   PCB+: APPLY +2.50±0.01 V.D.C. TO TP2, AND SET PROBE TONE TO 83.7 – 84.4 dB BY ADJUSTING R24.

** 7. COMPLIANCE – ORIGINAL PCB: USING 0.2, 1.0, 2.0, 3.0 cc CAVITIES, COMPLIANCE SHALL READ WITHIN THE QUALITY CONTROL SPEC (A00848 NOTE 6). IF NOT, RESET PER A00848 NOTE 6.
   PCB+: USING 0.2, 0.5, 1.0, 2.0, 3.0 cc CAVITIES, COMPLIANCE SHALL READ WITHIN THE QUALITY CONTROL SPEC (A01785 NOTE 6I) WITH AN ADDITIONAL ±1.0 COUNT TOLERANCE AT 3.0 cc. IF NOT, RESET PER A01785 NOTE 6.

8. PRESSURE – AFTER THE UNIT HAS BEEN ON FOR 10 MINUTES, CALIBRATION SHALL READ PER A00849 NOTE 6 F AND G. IF NOT, RESET PER A00849 NOTE 6 A–G.

9. SWEEP RATE – WITH THE PROBE TIP COUPLED TO A 1.0 cc CAVITY, THE SWEEP PERIOD SHALL BE 2.38 – 2.57 SECONDS. IF NOT, SET R39 TO BRING IT WITHIN THIS RANGE.

10. NOISE, PUMP CAPACITY – PROBE TIP IS COUPLED TO A 2.0 cc TEST CAVITY, AND START/RUN BUTTON ACTUATED. THE DISPLAY SHALL BE A FLAT LINE, WITH FLUCTUATIONS IN ADMITTANCE OF 1.0 PIXEL PERMITTED.

NOTE: IF ANY ADJUSTMENTS ARE MADE, GLYPTOL MUST BE RE–APPLIED TO AFFECTED TRIMPOTS EXCEPT FOR C3.

** NOTE: SOUND LEVEL, COMPLIANCE MEASUREMENT AND CALIBRATION ARE SLIGHTLY DIFFERENT FOR ORIGINAL BOARD (PART NO. 236116–501 WITH DAUGHTER BOARD, SHIPPED UNTIL APPROX. 1/15/88) AND NEW TYMP PLUS PCB (PART NO. 236220–501, WITH NO S1, NO DAUGHTER PCB, WITH TEST POSTS) LAYOUTS. SECTIONS WITHOUT HEADINGS ARE COMMON. SECTIONS HEADED "ORIGINAL PCB" ARE FOR OLD PCB. THOSE HEADED "PCB+" ARE FOR NEW, OR TYMP PLUS PCB.

QTY	QTY	QTY	QTY	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
504	503	502	501			LIST OF MATERIAL

MATERIAL: FINISH:

REF. DWGS

UNLESS OTHERWISE SPECIFIED:

METRIC DIMENSIONS (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS = CLASS–2 A
INTERNAL THDS = CLASS–2 B

GROUP OR PART	NEXT ASS'Y	QTY	USED ON
	APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGLES: ± 1/2 DEGREE

DO NOT SCALE

		DATE
DRAWN	CR WOJNOWICZ	6/8/87
CHECKED	JJS	6/23/87
APPROVED	AJK	6/23/87
REL.FOR PROD.	BC	6/24/87

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: MICROTYMP RECALIBRATION SPEC

CODE IDENT. 64475 | C | DRAWING NO. A01745 | REV. B

SCALE NONE | SHEET OF 1

A	A01862	A

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	REL TO PROD ENG	5-17366	CRW	6/15/88	

ANVIL 1000
FILE NAME: A01862A1

1. ONLY ONE BALLAST COMPARTMENT WILL BE USED. THEREFORE, ONE FLEXITE TUBE (ITEM 3 ON 236175-501) IS PLUGGED OFF WITH PISTON BALL (ITEM 10) AND BLACK MAX (ITEM 7). THIS OPERATION CAN BE PERFORMED ANYTIME BEFORE INTERNAL COMPONENT ASSEMBLY CALIBRATION AND TESTING (A00785) IS BEGUN.

2. DURING THE TESTS PERFORMED AT FINAL ASSEMBLY (A00847), SPECIAL ATTENTION SHOULD BE PAID TO NOISE TEST (#6). IN ADDITION, PUMP CAPACITY TEST MUST BE PERFORMED:
   WITH A 2.0cc CAVITY AFFIXED TO THE PROBE TIP, UNIT HOOKED UP TO CALIBRATOR, MINIMUM PRESSURE GENERATED BY UNIT (FROM HOME POSITION) TO BE +330/-500 daPa.

3. TO THE SERIAL NUMBER ADD THE SUFFIX "H" (ON ALL STICKERS FROM CONTROL CARD).

		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
		TOLERANCES ON:			
		BASIC DIMENSION	.XX	.XXX	
		UP TO 6	± .02	± .005	
		ABOVE 6 TO 24	± .03	± .010	
		ABOVE 24	± .06	± .015	
NEXT ASS'Y	QTY	ANGLES: ± 1/2 DEGREE			
APPLICATION		METRIC = ( )			

DRAWN CR WOJNOWICZ	DATE 6/15/88
CHECKED	6/15/88
APPROVED	6/15/88
REL FOR PROD	6/24/88
DO NOT SCALE	

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: MICROTYMP HIGH ALTITUDE MODIFICATIONS

CODE IDENT		DRAWING NO.	REV
64475	A	A01862	A

SCALE NONE SHEET 1 OF 1

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
H	REVISED & REDRAWN; ADDED SHEET 2; SEE MARKED-UP BLUEPRINT FOR REVISIONS	S-14255	CFH	11-5-86	
J	REV'D. NOTE 6 AND NOTE 11 (1.5cc WAS 1.0CC)	S-14728	CFH	2-25-87	
K	REV'D. NOTE 6 & SHEET 2 OF 2 (FIG 3E)	S-14828	CFH	3-13-87	
L	REV'D. NOTES 1, 3, 5, 6D, 7C, ADDED 6F, 9A, 10 & 11; RENUMBERED 12-19	S-15019	CFH	4-22-87	
M	REV'D NOTE 12	S-15045	CFH	4-25-87	
N	REV'D NOTE 7C & 7D-CHANGED (A) TO (B)	S-15208	CFH	5-29-87	
P	REV'D. NOTE 3 - 12dc.P.. WAS 2; REM'D. /SEC. & AVERAGED	S-15254	CFH	6-11-87	
R	ADDED TO NOTE 7A	S-15351	CFH	10-15-87	
S	REV'D. NOTE 5, 6A, 6B, 6D & 6E; ADD'D. TABLES I & II	S-17007	CFH	4-22-88	
T	REV'D NOTE 19-TABLE I	S-30484	DLS	7-6-95	

NOTES:

1. GENERAL - ANY UNIT WHICH DOES NOT MEET ALL TEST CRITERIA OR CANNOT BE PROPERLY ADJUSTED SHALL BE REPAIRED. TESTS INDICATED BY AN ASTERISK (*) ARE REQUIRED FOR 100% INSPECTION. OTHER TESTS MAY BE PERFORMED ON A NO. BASIS, AS NEEDED. TO MAINTAIN MAXIMAL YIELD. SEE 236116 FOR LOCATION OF COMPONENTS AND TEST POINTS.

2. TEST CONDITIONS - UNLESS OTHERWISE SPECIFIED, THE FOLLOWING TEST CONDITIONS APPLY:

   A. AMBIENT TEMPERATURE: 20 - 30 DEG. C.

   B. +3.5 V.D.C. AND +7.2 V.D.C. REGULATED POWER SUPPLIES ±0.05V CONNECTED TO POINTS INDICATED ON 236011.

   C. START/RUN BUTTON ACTUATED MOMENTARILY TO PUT UNIT IN "ON" MODE.

   D. LCD IS VIEWED PER A00848, FIG. 1. ONLY INDICATIONS SHALL BE FLICKER FREE AND HAVE UNIFORM, ADEQUATE CONTRAST.

*3. PNEUMATIC SEAL - WITH THE VALVE CLOSED VIA CALIBRATOR T3281 AND PRESSURES OF +300 AND -300 daPa APPLIED TO THE PROBE TIP, THE LEAK RATE SHALL BE LESS THAN 12 daPa OVER A 5 SEC. PERIOD.

*4. SOUND LEVEL - THE UNIT IS COUPLED TO A SOUND LEVEL METER AS SHOWN IN FIG. 4. CARE SHOULD BE TAKEN TO ASSURE AN ACOUSTIC SEAL BETWEEN ALL ELEMENTS. S1 IS DEPRESSED (UP POSITION). +3.00 V.D.C. (W.R.T. NEG) IS APPLIED TO TP2.

THE SOUND LEVEL METER SHALL MEASURE ABSOLUTE SOUND PRESSURE LEVEL WITH RESPECT TO 20uPA. AND SHALL BE EQUIPPED WITH A 1/3 OCTAVE BAND FILTER HAVING A CENTER FREQUENCY OF 250 HZ. THE PROBE TONE SHALL BE SET TO 84.0-85.0dB BY ADJUSTING R24. ONCE SET, THE LEVEL SHALL BE STABLE WITHIN ±0.1dB OVER A FIVE SECOND PERIOD.

5. DISTORTION - TEST CONDITIONS ARE THE SAME AS THOSE OUTLINED IN NOTE 4, EXCEPT FOR THE CENTER FREQUENCY OF THE FILTER. THE MEASURED LEVELS SHALL NOT EXCEED THOSE SHOWN BELOW:

FILTER CENTER FREQ. (HZ)	MAX. SOUND LEVEL (DB)
500	55
1000	49
2000	39

*6. COMPLIANCE CALIBRATION - COUPLED TO A 2CC CAVITY (AS SHOWN IN FIG. 2), WITH S1 OPEN AND 3V DC APPLIED TO TP2, THE OUTPUT AT TP3 SHALL BE SET TO 3.00 ±.05 V.D.C. BY ADJUSTING R33. S1 IS THEN CLOSED AND THE 3V DC IS DISCONNECTED FROM TP2. CARE SHOULD BE TAKEN TO ASSURE AN ACOUSTIC SEAL BETWEEN ALL ELEMENTS. OPEN AND CLOSE S1 10 TIMES, AND RECHECK 3.00 VDC READING. RESET IF NECESSARY.

   A. USING A 1.0 CC CAVITY "COMPLIANCE" IS SET PER TABLE I BY ADJUSTING R70.

   B. USING A 3.0 CC CAVITY "COMPLIANCE" IS SET PER TABLE I BY ADJUSTING R69.

   C. STEPS (A) AND (B) ARE REPEATED UNTIL BOTH READINGS REMAIN WITHIN SPECIFIED LIMITS.

   D. USING A 2.0 CC CAVITY "COMPLIANCE" SHALL BE WITHIN LIMITS IN TABLE II.

   E. USING A 0.2 CC CAVITY "COMPLIANCE" SHALL BE WITHIN LIMITS IN TABLE II.

   F. NOTE: FOR Q.C. PURPOSES, AN ADDITIONAL ±1 COUNT TOLERANCE IS ALLOWED.

7. PUMP SPEED

   A. WITH THE PROBE TIP COUPLED TO A 2.0 CC CAVITY, ACTUATE START/RUN BUTTON. A COMPLETE TRACE SHALL BE DISPLAYED (PER NOTE 13, EXCEPT V_{ss} = 2.0 CC). NOTE: IF V_{ss} DISPLAYS AT ARROW, UNIT CAN BE TESTED IN A 1.9cc QUICK CHECK WELL. UNIT IS ACCEPTABLE IF V_{ss} READING IS WITHIN 1.9cc OUTLINE ON CALIBRATION CHECK OVERLAY.

   B. PRESSURIZATION RATE - WITH THE PROBE TIP COUPLED TO A T3270 (1.0CC) TEST CAVITY, AND THE START/RUN BUTTON ACTIVATED, THE PRESSURIZATION PERIOD (SEE FIG. 1) SHALL BE 0.38-1.0 SEC.

   *C. SWEEP RATE - WITH THE CONDITIONS OF (B), THE SWEEP PERIOD SHALL BE SET TO 2.40-2.55 SEC. BY ADJUSTING R39. MEASUREMENT FROM LEADING EDGE OF FIRST PULSE TO LEADING

   D. SWEEP RATE LINEARITY - WITH THE CONDITIONS OF (B). THE INTERVALS BETWEEN ALL CONSECUTIVE PULSES AT TP7 DURING THE SWEEP PERIOD SHALL BE 80-150mSEC.

8. CURRENT DRAIN - THE CURRENT DRAIN FROM THE +7.2 V.D.C. POWER SUPPLY SHALL BE 65mA MAX. DURING THE PRESSURIZATION AND SWEEP PERIODS (EXCLUDING START, STOP AND REVERSAL TRANSIENTS).

9. NOISE - DURING THE SWEEP PERIOD (SEE FIG. 1), THE NOISE AT TP6 SHALL BE LESS THAN 75mV P-P WITH THE PROBE TIP COUPLED TO A T3259 (0.2CC) TEST CAVITY. CARE SHOULD BE TAKEN TO ASSURE THAT NO SIGNIFICANT ADDITIONAL VIBRATION COUPLING IS ADDED TO THE PUMP AND THE REMAINDER OF THE ASSY DURING THIS TEST. TEST CAVITY SHOULD BE FIRMLY CLAMPED TO PROBE TIP.

*10. OPEN DETECT - WITH TIP OPEN TO THE ATMOSPHERE, DEPRESS START/RUN BUTTON MOMENTARILY. THE OPEN SYMBOL (FIG. 3G) SHALL FLASH REPEATEDLY ON THE LCD.

*11. BLOCK DETECT - WITH PROBE TIP OCCLUDED, DEPRESS START/RUN BUTTON. THE BLOCK SYMBOL (FIG. 3F) SHALL ALTERNATE FLASHING WITH THE RUN SYMBOL ON THE LCD.

*12. LEAK DETECT - UNIT IS RUN IN A 1.0-2.0 CC TEST CAVITY. CAVITY IS PULLED AWAY FROM UNIT WHEN PRESSURE IS BETWEEN +200 AND 0 daPa. THE "RUN" AND "LEAK" INDICATORS (FIG. 3, PATTERNS A & E) SHALL APPEAR.

13. TYMPANOGRAM OF TEST CAVITY - WITH THE PROBE TIP COUPLED TO A T3270 (1.0CC) TEST CAVITY, THE START/RUN BUTTON IS ACTUATED MOMENTARILY. THE DISPLAY INDICATION SHALL BE PER FIG. 3 , PATTERN B, EXCEPT ADMITTANCE MEASURING ASSY FLUCTUATE 1 PIXEL HIGHER ON THE VERTICAL SCALE. AT THE COMPLETION OF THIS TEST, AND BEFORE THE UNIT HAS SHUT ITSELF OFF, THE RIGHT STORE BUTTON (LABELLED ↱) SHALL BE ACTUATED MOMENTARILY.

14. TYMPANOGRAM OF EAR SIMULATOR - WITH THE PROBE TIP COUPLED TO A 2263B EAR SIMULATOR, THE START/RUN BUTTON IS ACTUATED MOMENTARILY. THE DISPLAY INDICATION SHALL BE PER FIG.3 , PATTERN C. AT THE COMPLETION OF THIS TEST, AND BEFORE THE UNIT HAS SHUT ITSELF OFF, THE LEFT STORE BUTTON LABELLED ↰) SHALL BE ACTUATED MOMENTARILY.

15. MEMORY RECALL - THE UNIT SHALL BE ALLOWED TO TURN ITSELF OFF (APPROX. 40 SEC. FROM LAST BUTTON ACTUATION UNTIL TIME-OUT). WHEN THE UNIT IS TURNED ON AGAIN (BY MOMENTARILY ACTUATING THE START/RUN BUTTON) AND THE RIGHT STORE AND LEFT STORE ARE EACH MOMENTARILY ACTUATED, FIG. 3 DISPLAY PATTERNS B AND C RESPECTIVELY, SHALL BE INDICATED.

16. ERASE TIME - THE LEFT STORE BUTTON IS HELD DOWN. FIG. 3 DISPLAY PATTERN D SHALL APPEAR ON THE LCD 2.7-3.3 SEC. FOLLOWING ACTUATION. THIS TIME MAY BE REARMED BY THE INTERVAL BETWEEN CORRESPONDING PULSES AT TP7.

17. PRESSURE RANGE ERROR - APPLY +200 daPa PRESSURE TO PROBE TIP. ACTUATE START/RUN BUTTON. DISPLAY PATTERN I (FIG. 3) SHOULD APPEAR.

18. SWITCH CALIBRATOR TO CALIBRATE MODE. DISPLAY PATTERN H (FIG. 3) SHOULD APPEAR.

19. VENT RATE - WITH 1 CC CAVITY ON END OF PROBE, +50 daPa PRESSURE APPLIED TO UNIT. VALVE IS OPENED USING CALIBRATOR. PRESSURE MUST REACH 0 daPa WITHIN 1000 MSEC.

NOTE: FOR TESTS 4 - 6, AMBIENT NOISE MUST BE LESS THAN 74 dB. CALIBRATOR IS HOOKED UP, CALIBRATOR POSITION VALVE MUST BE CLOSED VIA CALIBRATOR.

PCS ORIGINAL ONLY

⑦ BAROMETRIC PRESSURE RANGE (Mbar) — COMPLIANCE 3 CC — COMPLIANCE 1 CC — CALIBRATION POINT

RANGE (Mbar)	3 CC	1 CC
947-952	C4-C6	73 - 74
953-959	C4-C5	72 - 73
960-968	C3-C4	72 - 73
969-975	C2-C3	72 - 73
976-983	C1-C2	71 - 72
984-993	C0-C1	71 - 72
994-1000	BB-C0	71 - 72
1001-1008	B9-BF	70 - 71
1009-1017	B8-B8	70 - 71
1018-1025	BC-B0	70 - 71
1026-1051	B8-BC	67 - 70

. PCS ORIGINAL ONLY

TABLE I "Corrected Calibration Points" (corrected A-00848 values)

TABLE II

BAROMETRIC PRESSURE - COMPLIANCE RANGE

RANGE (Mbar)	3 CC	2 CC	1 CC	1 CC
947-952	C4-CC	9B-BF	78-76	4A-52
953-959	C3-CB	9A-9F	6F-75	49-51
960-968	C2-CA	99-9E	6F-75	49-51
969-978	C1-C9	98-9D	6F-75	49-51
976-983	C0-C8	98-9D	6E-74	49-51
984-993	BF-C7	97-9C	6E-74	49-51
994-1000	BE-C6	96-9B	6E-74	49-51
1001-1008	BD-C5	96-9B	6D-73	49-51
1009-1017	BC-C4	95-9A	6D-73	49-51
1018-1020	BB-C3	95-9A	6D-73	49-51
1021-1025	BA-C3	94-99	6D-73	49-51
1026-1031	BA-C2	94-99	6C-72	49-51

SEE SHEET 2 FOR FIG. 1 THRU FIG. 4

SUPERSEDES DWG. A00848 DATED 1-21-85

MATERIAL: ~ FINISH: ~

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING. EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON: BASIC DIMENSION | XX ± | XXX ±; UP TO 6 | .02 | .005; ABOVE 6 TO 24 | .05 | .010; ABOVE 24 | .08 | .015; ANGLES: ± ½ DEGREE. DO NOT SCALE

QTY SOA	QTY 002	QTY 003	QTY 001	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
						LIST OF MATERIAL

GROUP OR ASSY	NEXT ASSY	QTY	USED ON
	APPLICATION		

DRAWN: CFH 11-5-86 | CHECKED: [illegible] | APPROVED: [illegible] | REL. FOR PROD.: [illegible] 11-12-86

WELCH ALLYN, INC. SKANEATELES FALLS, N.Y. U.S.A.

TITLE: TYMP. INTERNAL COMPONENT ASS'Y. TEST SPECIFICATION

CODE IDENT. 64478 | SIZE D | DRAWING NO. A00848 | REV T | SCALE ~ | SHEET 1 OF 2

A00848 S

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
H	REVISED & REDRAWN SHEET 1 & ADD'D. SHEET 2	5-14295	CFH	11-5-86	
K	FIG. 3B - 1.5CC WAS 1.0CC	5-14951	CFH	3-13-87	

FIG. 1 PUMP SPEED

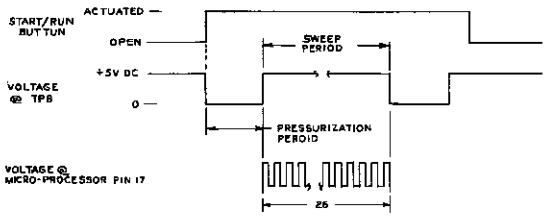


FIG. 2 COMPLIANCE CALIBRATION SET-UP

TEST CAVITIES

VOL.(CC)	P/N
0.2	T3268
0.5	T3269
1.0	T3270
2.0	T3271
3.0	T3272

DWG. NO. 23500412

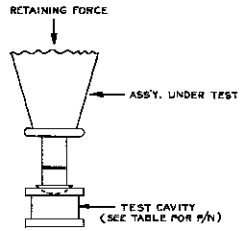


FIG. 3 DISPLAY PATTERNS

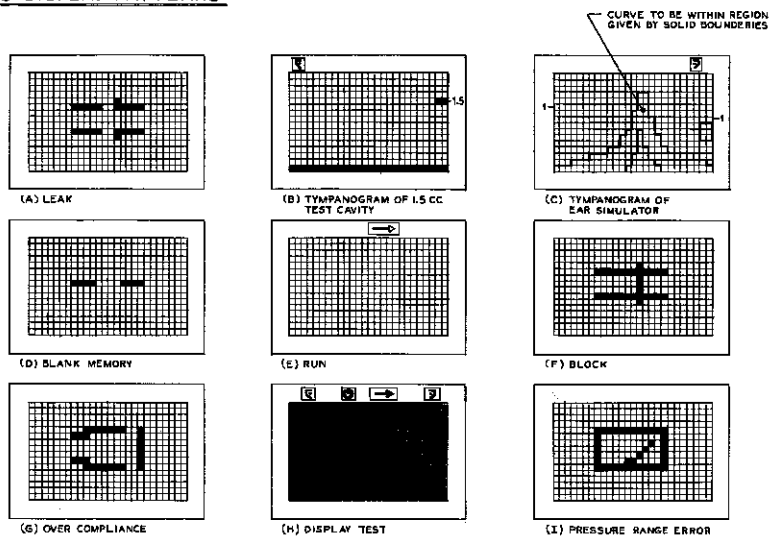
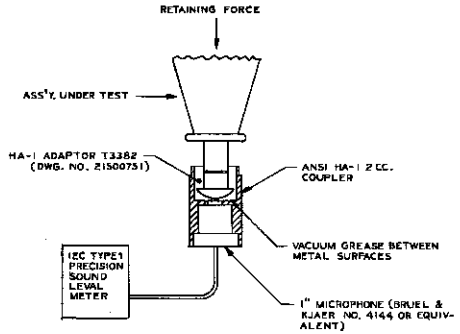


FIG. 4 SOUND LEVEL MEASUREMENT SET-UP


RETAINING FORCE
ASS'Y. UNDER TEST
HA-1 ADAPTOR T3382 (DWG. NO. 21500751)
ANSI HA-1 2 CC. COUPLER
VACUUM GREASE BETWEEN METAL SURFACES
IEC TYPE1 PRECISION SOUND LEVAL METER
1" MICROPHONE (BRUEL & KJAER NO. 4144 OR EQUIVALENT)

MATERIAL: ~ FINISH: ~

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING: EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .05	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .02	± .015

ANGLES = ± DEGREES

DO NOT SCALE

QTY 204	QTY 203	QTY 202	QTY 201	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
						LIST OF MATERIAL

DRAWN	CFH	DATE 11-5-86
CHECKED		
APPROVED		
REL. ENG. PROD.		

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: TYMP. INTERNAL COMPONENT ASS'Y. TEST SPECIFICATION

CODE IDENT. 66476 | SIZE D | DRAWING NO. A00848 | REV. K

SCALE ~ SHEET 2 OF 2

A00848 K

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD. ENG.(V3)	S-11494	CPH	3-26-86	
B	REV'D NOTES 5,7 & 13. SEE SH. 2.	S-11597	MGS	1/7/86	
C	NOTE 10 A. 6F WAS 59	S-11716	MGS	5/2/86	
D	REV'D NOTE 7.	S-11858	MGS	8/8/86	
E	REVISED NOTE (SEE MARKED-UP BLUEPRINT) REV'D & REDRAWN SHEET 2	S-11955	CPH	11-6-86	
F	REV'D. NOTES 7, 9A & 11 (ADD NOTE);	S-12127	CPH	2-26-87	
G	ADDED NOTE 12	S-12207	CPH	4-22-87	
H	REV'D. NOTES 1, 5, 6F, 6G, 8, 9 & 11; DELETE 4, 9A, 9B	S-12019	CPH	4-22-87	
J	REV'D. NOTE 4 - 2-10uA WAS 10-100uA; ADDED +7.2V 10-40uA; OPEN ("OFF" MODE)	S-11562	CPH	5-19-87	
K	REV'D. NOTE 4 (25-60uA) WAS 10-60; NOTE 10(A01777) WAS A00841; NOTES 11 & 12, ADDED NOTES 13, 14 & 15	S-11930	CPH	3-31-88	

NOTES:

1. GENERAL - IF ANY SPECIFICATION OR ADJUSTMENT CANNOT BE ACHIEVED, THE UNIT IS CONSIDERED UNACCEPTABLE AND SHALL BE REPAIRED. TESTS INDICATED WITH AN ASTERISK (*) ARE REQUIRED FOR 100% INSPECTION. OTHER TESTS MAY BE PERFORMED ON AN AQL BASIS AS REQUIRED TO MAINTAIN MAXIMAL YIELD. SEE 236315 (PCB ASSY) FOR LOCATION OF ALL COMPONENTS AND TEST POINTS.

2. TEST CONDITIONS - UNLESS OTHERWISE SPECIFIED, THE FOLLOWING TEST CONDITIONS APPLY:

   A. AMBIENT TEMPERATURE 20 - 30 DEG. C.

   B. +7.2 V.D.C., +3.6 V.D.C. AND NEG CONNECTED TO A REGULATED POWER SUPPLY (SEE 236065 FOR CONNECTIONS). ±.05V

   C. W.A. CALIBRATION FIXTURE NO. T2881 (DWG NO. 40500060) OR EQUIVALENT CONNECTED TO UNIT UNDER TEST AS SHOWN IN A00841. CALIBRATOR IS IN "RUN" MODE.

   D. "PRESS" AND "COMP" ARE USED TO INDICATE THE DIGITAL OUTPUT OF THE CALIBRATOR (IN HEXADECIMAL FORMAT) FOR THE PRESSURE AND COMPLIANCE SIGNALS RESPECTIVELY.

   E. LCD IS VIEWED PER FIG. 1. ANY INDICATIONS SHALL BE FLICKER-FREE AND HAVE UNIFORM, ADEQUATE CONTRAST. ANY DISPLAY WHICH IS OF QUESTIONABLE QUALITY SHALL BE CHECKED PER 236626 (LCD), PARTICULARLY PER NOTE 9, SHEET 1 (CONTRAST).

   F. FOR ALL SOUND LEVEL MEASUREMENTS, AMBIENT NOISE SHALL BE AT LEAST 10dB BELOW THE SIGNAL OF INTEREST.

3. CURRENT DRAIN - CURRENT DRAIN SHALL NOT EXCEED THE LIMITS LISTED BELOW:

PWR SUPPLY	CURRENT DRAIN	START/RUN BUTTON POSITION
+3.6V	2-10uA	OPEN ("OFF" MODE)
+7.2V	10-60uA	OPEN ("OFF" MODE)
+7.2V	25-60mA	ACTUATED

*4. PROBE TIP/SEAL - INSERT TUBE INTO TUBING CONNECTOR AS SHOWN IN FIG. 2. PRESSURES OF +300 AND -300 daPa APPLIED AS SHOWN IN FIG. 2. THE LEAK RATE AT EACH PRESSURE SHALL BE LESS THAN 2 daPa OVER A 5 SEC. PERIOD.

*5. PRESSURE CALIBRATION - THE CALIBRATOR IS SWITCHED TO "CALIBRATE" MODE. PRESSURE IS APPLIED PER FIG. 2.

   A. UNIT MUST BE LEFT ON FOR 10 MINUTES BEFORE PERFORMING CALIBRATION.

   B. AT ATMOSPHERIC PRESSURE, "PRESSURE" SHALL BE SET TO 69-83 BY ADJUSTING R26.

   C. AT +200 daPa "PRESSURE" SHALL BE SET TO 81-83 BY ADJUSTING R21.

   D. STEPS (A) AND (B) ARE REPEATED UNTIL BOTH READINGS REMAIN WITHIN SPECIFIED LIMITS.

   E. AT -300 daPa, "PRESSURE" SHALL BE 49-53.

   F. NOTE: WHEN UNIT HAS BEEN ON MORE OR LESS THAN 10 MINUTES, ZERO POINT (SET BY *E5) WILL DRIFT. DIFFERENCE BETWEEN 0 AND +200 daPa MUST REMAIN 38-42 COUNTS, WHILE DIFFERENCE BETWEEN 0 AND -300 daPa REMAINS 54-65 COUNTS.

   G. NOTE: FOR QC PURPOSES, AN ADDITIONAL ±1 COUNT IS ALLOWABLE FOR BANDS FROM 0 TO +200, 0 TO -300 daPa.

7. OPTIONAL INTERRUPTER FUNCTION - USING THE SET-UP SHOWN IN FIG. 4, INTERRUPTER IS BLOCKED. CALIBRATOR IS SWITCHED FROM CALIBRATE TO RUN OPERATIONS. WHEN BLADE IS REMOVED FROM INTERRUPTER, UNIT SHOULD TURN OFF MOMENTARILY.

*8. LCD CONTRAST/ADJUSTMENT - SWITCH CALIBRATOR TO RUN MODE AND TURN UNIT ON, OR SWITCH TO CALIBRATE MODE. R71 IS ADJUSTED TO YIELD MAXIMUM CONTRAST UNDER VIEWING CONDITIONS OF FIG. 1. DISPLAY QUALITY TO BE PER NOTE 9E.

NOTE: CALIBRATOR SHOULD BE SWITCHED TO RUN MODE.

9. START/RUN BUTTON - MAXIMUM FORCE REQUIRED FOR PROPER ACTUATION SHALL BE 300 g.

*10. RECHARGE DISABLE CHECK - WHEN A MATING SWITCHCRAFT NO. SF-765 PLUG (OR EQUIVALENT) IS CONNECTED TO THE POWER JACK OF THE WIRING HARNESS (SEE A01777, PCB TEST SPEC, FIG. 2), AND THE START/RUN BUTTON IS ACTUATED (PER NOTE 13.) THERE SHALL BE NO INDICATION ON THE LCD.

*11. LCD FUNCTION - FOR EACH CONDITION LISTED BELOW, THE CORRESPONDING PATTERN FROM FIG. 3 SHALL BE INDICATED ON THE LCD. FOR ALL CONDITIONS, IT IS ASSUMED THAT THE START/RUN BUTTON HAS BEEN PREVIOUSLY ACTUATED TO TURN THE UNIT "ON".

NOTE: BEGIN TEST BY BRIEFLY DISCONNECTING 7.2V SUPPLY (+) WIRE AND RECONNECTING IT. IF PATTERN DOES NOT APPEAR, BLOCK OPTICAL INTERRUPTER MOMENTARILY, AS IN FIG. 4, AND REDO TEST.

TEST NO.	CONDITION	PATTERN NO.	PATTERN DESCRIPTION
A	LEFT STORE BUTTON ACTUATED (SEE 236065)	C & I	BLANK MEMORY LEFT BAR
B	RIGHT STORE BUTTON ACTUATED (SEE 236065)	C & H	BLANK MEMORY RIGHT BAR
C	REDUCE 7.2V SUPPLY SLOWLY UNTIL SYMBOL APPEARS. VOLTAGE ON SUPPLY MUST BE BETWEEN 6.2 - 6.5V AT TRIP POINT. INCREASE 7.2V SUPPLY TO 7.0V AND VERIFY THAT SYMBOL GOES AWAY. RETURN 7.2V SUPPLY TO 7.15 TO 7.25 SETTING.	B	LOW BATTERY**

12. CHECK CONTINUITY OF CHARGE JACK CENTER CONTACT TO CHARGE CONTACT (LEFT SIDE), AND CHARGER JACK GROUND CONTACT TO GROUND CONTACT (RIGHT SIDE). TURN OFF POWER DURING THIS TEST.

**13. SLOW CLOCK (VALVE PULSE) - USE STORAGE OSCILLOSCOPE AT TP7. CALIBRATOR IN "CALIBRATE MODE", ACTIVATE "PRESSURIZE" BUTTON ON CALIBRATOR, AND NOTE PULSE WIDTH LOW AT TP7 (IGNORE NARROW (20 usec) PULSES). PULSE WIDTH SHALL BE 10.9 TO 12.8 msec WIDE.

14. REPAIR/REWORK - REFER TO 236065 FOR CLEANING REQUIREMENTS.

**15. TIMING (FAST CLOCK) - CALIBRATOR IN "CALIBRATE" MODE. READING SHALL BE BETWEEN 412 AND 456.

**RECALIBRATION PER A01777 IF REQUIRED.

SEE SHEET 2

MATERIAL:	FINISH:	QTY 004	QTY 004	QTY 002	QTY 001	ITEM SYMBOL	PART NUMBER	DESCRIPTION
								LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSION (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING.
EXTERNAL THDS = CLASS 3 A
INTERNAL THDS = CLASS 2 B

REF. DWGS

NEXT ASSY	QTY	USED ON
APPLICATION		

GROUP WT. PER

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:		
BASIC DIMENSION	.XX	.XXX
UP TO 6	± .04	± .005
OVER 6 TO 24	± .06	± .010
ABOVE 24	± .08	± .015

ANGLES: ± ½ DEGREE

DO NOT SCALE

DRAWN	M.G.SMITH	1-22-85
CHECKED		
APPROVED		2-6-85
REL. FOR PROD.		4-5-85

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE ELECTRONICS ASSY TEST SPECIFICATION

CODE IDENT.	DRAWING NO.	REV
84478	A00849	K

SCALE ~ SHEET 1 OF 2

A00849 K

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
E	REVISED & REDRAWN (SEE MARK-UP BLUEPRINT)	S-14258	CFH	11-4-86	

FIG. 1 LCD VIEWING CONDITION

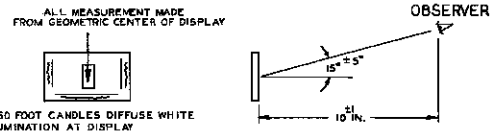

ALL MEASUREMENT MADE FROM GEOMETRIC CENTER OF DISPLAY
OBSERVER
15° ±5°
±1 10 IN.
40-60 FOOT CANDLES DIFFUSE WHITE ILLUMINATION AT DISPLAY

FIG. 2 PNEUMATIC TEST SET-UP

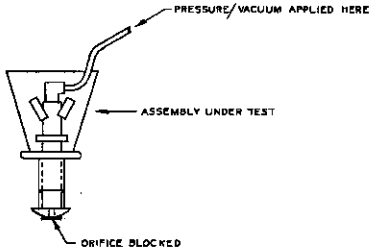


FIG. 3 DISPLAY PATTERNS

GRID SHOWN FOR REFERENCE ONLY

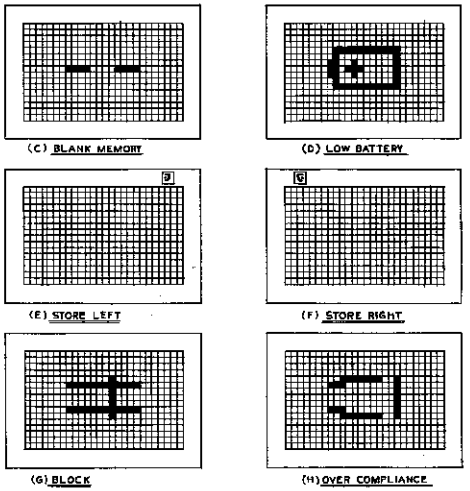
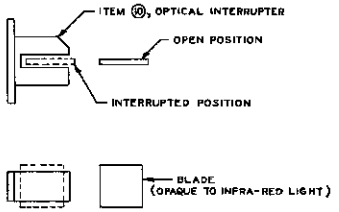


FIG. 4 OPTICAL INTERRUPTER TEST SET-UP



SUPERSEDES SHEET 2 DATED 1-19-85

QTY	QTY	QTY	QTY	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
864	865	882	861			LIST OF MATERIAL

MATERIAL: ~ FINISH: ~

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING: EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B. REF. DWGS

NEXT ASSY	QTY	USED ON
APPLICATION		

GROUP TECH PART

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES. TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .05	± .005
ABOVE 6 TO 24	± .02	± .010
ABOVE 24	± .05	± .015

ANGLES: ± ½ DEGREE. DO NOT SCALE

		DATE
DRAWN	CFH	11-4-86
CHECKED		11/18/86
APPROVED		11/18/86
RELEASE PROD.		11-25-86

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE ELETRONICS ASS'Y. TEST SPECIFICATIONS

CODE IDENT.	DRAWING NO.	REV.
84478	A00849	E

SCALE ~ SHEET 2 OF 2

A00849

ANVIL 1000
FILE NAME A01785C1

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	REL TO PROD ENG	S-16270	CRW	12/7/87	KJB
B	REV'D NOTE 5	S-16400	CRW	1/5/88	AJK
C	ADD'D NOTE 20	S-16930	CRW	3/31/88	KJB
D	REV'D NOTE 7C	S-24601	DLS	8-4-92	

NOTES:

1. GENERAL – ANY UNIT WHICH DOES NOT MEET ALL TEST CRITERIA OR CANNOT BE PROPERLY ADJUSTED SHALL BE REPAIRED. SEE WELCH ALLYN DRAWING NUMBER 236220 FOR LOCATION OF COMPONENTS AND TEST POINTS.

2. TEST CONDITIONS – UNLESS OTHERWISE SPECIFIED, THE FOLLOWING TEST CONDITIONS APPLY:

   A. AMBIENT TEMPERATURE: 20°C TO 30 A. AMBIENT TEMPERATURE: 20°C

   B. +3.6 V.D.C. AND +7.2 V.D.C. REGULATED POWER SUPPLIES ±0.05V CONNECTED TO POINTS INDICATED ON WELCH ALLYN DRAWING NUMBER 236011

   C. START/RUN BUTTON ACTUATED MOMENTARILY TO PUT UNIT IN "ON" MODE

   D. LCD IS VIEWED PER WELCH ALLYN DRAWING A00649, FIGURE 1. ANY INDICATIONS SHALL BE FLICKER FREE AND HAVE UNIFORM, ADEQUATE CONTRAST

3. PNEUMATIC SEAL – WITH THE VALVE CLOSED VIA CALIBRATOR T3281 AND PRESSURES OF +300 AND –300 daPa APPLIED TO THE PROBE TIP, THE LEAK RATE SHALL BE LESS THAN 12 daPa OVER A 5 SECOND PERIOD.

4. SOUND LEVEL – THE UNIT IS COUPLED TO A SOUND LEVEL METER AS SHOWN IN FIGURE 4. CARE SHOULD BE TAKEN TO ASSURE AN ACOUSTIC SEAL BETWEEN ALL ELEMENTS. +2.50±0.01 V.D.C. (W.R.T. NEG) IS APPLIED TO TP2. THE SOUND LEVEL METER SHALL MEASURE ABSOLUTE SOUND PRESSURE LEVEL WITH RESPECT TO 20µPA AND SHALL BE EQUIPPED WITH A 1/3 OCTAVE BAND FILTER HAVING A CENTER FREQUENCY OF 250 Hz. THE PROBE TONE SHALL BE SET TO 83.8–84.2 dB BY ADJUSTING R24. ONCE SET, THE LEVEL SHALL BE STABLE WITHIN ±0.1 dB OVER A 5 SECOND PERIOD.

5. DISTORTION – TEST CONDITIONS ARE THE SAME AS THOSE OUTLINED IN NOTE 4 EXCEPT FOR THE CENTER FREQUENCY OF THE FILTER. THE MEASURED LEVELS SHALL NOT EXCEED THOSE SHOWN IN AT LEAST ONE OF THE SETS BELOW:

1/3 OCTAVE FILTER CENTER FREQUENCY (Hz)	MAXIMUM SOUND LEVEL (dB)		
500	39.3	45.0	47.6
630	56.0	54.3	51.3
1000	38.3	40.0	45.5

6. COMPLIANCE CALIBRATION – COUPLE TO A 2.0cc CAVITY WITH NO CONNECTION TO TP2. CARE SHOULD BE TAKEN TO ASSURE AN ACOUSTIC SEAL BETWEEN ALL ELEMENTS. SEE FIGURE 2 FOR TABLES I AND II

   A. THE OUTPUT AT TP2 SHALL BE SET TO 2.50±0.05 V.D.C. BY ADJUSTING R33

   B. MEASURE BAROMETRIC PRESSURE USING A GAUGE WHICH INDICATES TRUE PRESSURE (NOT REDUCED TO SEA LEVEL). TAKE READINGS AT LEAST TWICE PER DAY.

   C. USING A 3.0cc CAVITY "COMPLIANCE" IS SET ACCORDING TO TABLE I BY ADJUSTING R69.

   D. USING A 0.5cc CAVITY "COMPLIANCE" IS SET ACCORDING TO TABLE I BY ADJUSTING R70.

   E. STEPS (C) AND (D) ARE REPEATED UNTIL BOTH READINGS REMAIN WITHIN SPECIFIED LIMITS.

   F. USING A 2.0cc CAVITY "COMPLIANCE" SHALL MEET SPECIFICATION GIVEN IN TABLE II.

   G. USING A 1.0cc CAVITY "COMPLIANCE" SHALL MEET SPECIFICATION GIVEN IN TABLE II.

   H. USING A 0.2cc CAVITY "COMPLIANCE" SHALL MEET SPECIFICATION GIVEN IN TABLE II.

   I. FOR Q.C. PURPOSES, LIMITS ARE AN ADDITIONAL ±1 COUNT OVER THOSE GIVEN IN TABLE II.

7. PUMP SPEED

   A. WITH THE PROBE TIP COUPLED TO A 2.0cc CAVITY, ACTUATE START/RUN BUTTON. A COMPLETE TRACE SHALL BE DISPLAYED PER NOTE 1.5, EXCEPT Vea = 2.0cc. NOTE: IF Vea DISPLAYS AT ARROW, UNIT CAN BE TESTED IN A 1.0cc QUICK CHECK WELL. UNIT IS ACCEPTABLE IF Vea READING IS WITHIN 1.9cc OUTLINE ON CALIBRATION CHECK OVERLAY.

   B. PRESSURIZATION RATE – WITH THE PROBE TIP COUPLED TO A T3270 (1.0cc) TEST CAVITY, AND THE START/RUN BUTTON ACTIVATED, THE PRESSURIZATION PERIOD SHALL BE 0.5–1.0 SECOND. SEE FIGURE 1

   C. SWEEP RATE – WITH THE PROBE TIP COUPLED TO A 1.0 cc CAVITY, THE SWEEP PERIOD SHALL BE SET TO 2.45–2.55 SECONDS BY ADJUSTING R39. MEASURE FROM LEADING EDGE OF FIRST PULSE TO LEADING EDGE OF 26TH PULSE. SEE FIGURE 1

   D. SWEEP RATE LINEARITY – WITH THE CONDITIONS OF (A), THE INTERVALS BETWEEN ALL CONSECUTIVE PULSES AT TP7 DURING THE SWEEP PERIOD SHALL BE 50–150ms.

8. CURRENT DRAIN – THE CURRENT DRAIN FROM THE +7.2 V.D.C. POWER SUPPLY SHALL BE 60mA MAXIMUM DURING THE PRESSURIZATION AND SWEEP PERIODS (EXCLUDING START, STOP AND REVERSAL TRANSIENTS).

9. NOISE – DURING THE SWEEP PERIOD (SEE FIGURE 1), THE NOISE AT TP6 SHALL BE LESS THAN 78mV P–P WITH THE PROBE TIP COUPLED TO A T3269 (0.5cc) TEST CAVITY. CARE SHOULD BE TAKEN TO ASSURE THAT NO SIGNIFICANT ADDITIONAL VIBRATION IS ADDED TO THE PUMP AND THE REMAINDER OF THE ASSEMBLY DURING THIS TEST. TEST CAVITY SHOULD BE FIRMLY CLAMPED TO PROBE TIP.

10. OPEN DETECT – WITH TIP OPEN TO THE ATMOSPHERE, DEPRESS START/RUN BUTTON MOMENTARILY. THE OPEN SYMBOL, FIGURE 3(G), SHALL FLASH REPEATEDLY ON THE LCD.

11. BLOCK DETECT – WITH TIP PROBE OCCLUDED, DEPRESS START/RUN BUTTON. THE BLOCK SYMBOL, FIGURE 3(F), SHALL ALTERNATE FLASHING WITH THE RUN SYMBOL ON THE LCD.

12. LEAK DETECT – UNIT IS RUN IN A 1.0–2.0cc TEST CAVITY. CAVITY IS PULLED AWAY FROM UNIT WHEN PRESSURE IS BETWEEN +200 AND 0 daPa. THE "RUN" AND "LEAK" INDICATORS, FIGURES 3(A) & 3(E), SHALL APPEAR.

13. TYMPANOGRAM OF TEST CAVITY – WITH THE PROBE TIP COUPLED TO A T3270 (1.0cc) TEST CAVITY, THE START/RUN BUTTON IS ACTUATED MOMENTARILY. THE DISPLAY INDICATION SHALL BE PER FIGURE 3(B), EXCEPT ADMITTANCE READINGS MAY FLUCTUATE 1 PIXEL HIGHER OR ON THE VERTICAL SCALE. AT THE COMPLETION OF THIS TEST AND BEFORE THE UNIT HAS SHUT ITSELF OFF, THE RIGHT STORE BUTTON SHALL BE ACTUATED MOMENTARILY.

14. TYMPANOGRAM OF EAR SIMULATOR – WITH THE PROBE TIP COUPLED TO 1.9cc QUICK CHECK WELL IN 7116 EAR STAND, THE START/RUN BUTTON IS ACTUATED MOMENTARILY. THE DISPLAY INDICATION SHALL BE WITHIN APPROPRIATE LIMITS GIVEN ON STAND. AT THE COMPLETION OF THIS TEST AND BEFORE THE UNIT HAS SHUT ITSELF OFF, THE LEFT STORE BUTTON SHALL BE ACTUATED MOMENTARILY.

15. MEMORY RECALL – THE UNIT SHALL BE ALLOWED TO TURN ITSELF OFF (APPROXIMATELY 40 SECONDS FROM LAST BUTTON ACTUATION UNTIL TIME-OUT). WHEN THE UNIT IS TURNED ON AGAIN (BY MOMENTARILY ACTUATING THE START/RUN BUTTON) AND THE RIGHT STORE AND LEFT STORE ARE EACH MOMENTARILY ACTUATED, FIGURES 3(B) & 3(C) RESPECTIVELY SHALL BE INDICATED.

16. ERASE TIME – THE LEFT STORE BUTTON IS HELD DOWN. FIGURE 3(D) SHALL APPEAR ON THE LCD 2.7–3.3 SECONDS FOLLOWING ACTUATION. THIS TIME MAY BE MEASURED BY THE INTERVAL BETWEEN CORRESPONDING PULSES AT TP7.

17. PRESSURE RANGE ERROR – APPLY ±200 daPa PRESSURE TO PROBE TIP. ACTUATE START/RUN BUTTON. DISPLAY PATTERN 3(I) SHOULD APPEAR.

18. SWITCH CALIBRATOR TO CALIBRATE MODE. DISPLAY PATTERN 3(H) SHOULD APPEAR.

19. VENT RATE – WITH 1.0cc CAVITY ON END OF PROBE, +50 daPa PRESSURE IS APPLIED TO UNIT. VALVE IS OPENED USING CALIBRATOR. PRESSURE MUST REACH 0 daPa WITHIN 1000ms.

20. FAST CLOCK – CALIBRATOR IN "CAL" MODE SHALL BE 412–456.

✳ REQUIRED FOR 100% INSPECTION. OTHER TESTS MAY BE PERFORMED ON AN AQL BASIS AS NEEDED TO ASSURE MAXIMUM POSSIBLE YIELD.

NOTE: FOR TESTS 4–6, AMBIENT NOISE MUST BE 10 dB BELOW THE SIGNAL OF INTEREST. CALIBRATOR IS HOOKED UP AND SWITCHED TO "CALIBRATOR" POSITION. VALVE MUST BE CLOSED VIA CALIBRATOR.

FIGURE 1
PUMP SPEED

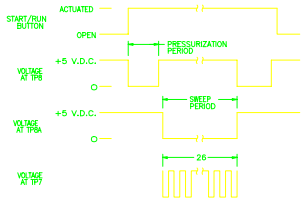


FIGURE 4
SOUND LEVEL MEASUREMENT SET–UP

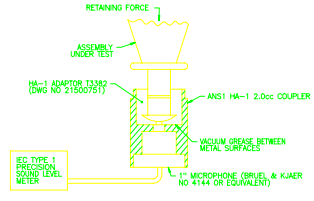
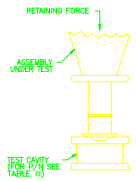

RETAINING FORCE
ASSEMBLY UNDER TEST
HA–1 ADAPTOR T3382 (DWG NO 21500751)
ANSI HA–1 2.0cc COUPLER
VACUUM GREASE BETWEEN METAL SURFACES
IEC TYPE 1 PRECISION SOUND LEVEL METER
½" MICROPHONE (BRUEL & KJAER NO 4134 OR EQUIVALENT)

FIGURE 2
COMPLIANCE CALIBRATION SET–UP



NOTE: CALIBRATION POINTS GIVEN IN TABLE I ARE NOMINAL SET POINTS. SET POINTS FOR 0.0cc AND 6.0cc CAN BE MOVED WITHIN RANGES GIVEN IN TABLE II IF REQUIRED TO ACCOUNT FOR COMPONENT VARIATIONS.

TABLE I NOMINAL SET POINTS

BAROMETRIC PRESSURE	3.0cc	0.5cc
947–952	C8–C9	5D–5E
953–959	C7–C8	5D–5E
960–968	C6–C7	5C–5D
969–975	C5–C6	5C–5D
976–983	C4–C5	5C–5D
984–993	C3–C4	5C–5D
994–1000	C3–C3	5C–5D
1001–1008	C1–C2	5C–5D
1009–1017	C0–C1	5C–5D
1018–1020	BF–C0	5C–5D
1021–1025	BF–C0	5C–5D
1026–1031	BE–BF	5C–5D

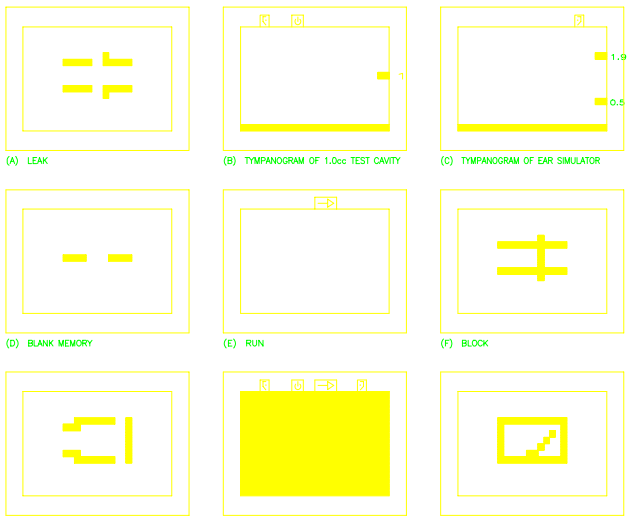
TABLE II ALLOWABLE RANGE

BAROMETRIC PRESSURE	3.0cc	2.0cc	1.0cc	0.5cc	0.2cc
947–952	C5–CB	9C–A0	71–75	5B–60	4F–53
953–959	C4–CA	9B–9F	70–74	5B–60	4E–52
960–968	C3–C9	9A–9E	70–74	5A–5F	4E–52
969–975	C2–C8	99–9D	70–74	5A–5F	4E–52
976–983	C1–C7	99–9D	6F–73	5A–5F	4E–52
984–993	C0–C6	98–9C	6F–73	5A–5F	4E–52
994–1000	BF–C5	97–9B	6F–73	5A–5F	4E–52
1001–1008	BE–C4	97–9B	6E–72	5A–5F	4E–52
1009–1017	BD–C3	96–9A	6E–72	5A–5F	4E–52
1018–1020	BC–C2	96–9A	6E–72	5A–5F	4E–52
1021–1025	BC–C2	95–99	6E–72	5A–5F	4E–52
1026–1031	BB–C1	95–99	6D–71	5A–5F	4E–52

TABLE III TEST CAVITIES

VOL (cc)	P/N
0.2	T3268
0.5	T3269
1.0	T3270
2.0	T3271
3.0	T3272

FIGURE 3
DISPLAY PATTERNS



(A) LEAK (B) TYMPANOGRAM OF 1.0cc TEST CAVITY (C) TYMPANOGRAM OF EAR SIMULATOR

(D) BLANK MEMORY (E) RUN (F) BLOCK

(G) OVER COMPLIANCE (H) DISPLAY TEST (I) PRESSURE RANGE ERROR

QTY	QTY	QTY	QTY	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
504	503	502	501			LIST OF MATERIAL

MATERIAL: FINISH:

REF. DWGS

UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSIONS (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS = CLASS–2 A
INTERNAL THDS = CLASS–2 B

GROUP OR PART | NEXT ASS'Y | QTY | USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:		
BASIC DIMENSION	.XX	.XXX
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGLES: ± 1/2 DEGREE

DO NOT SCALE

		DATE
DRAWN	CR WOJNOWICZ	9/24/87
CHECKED	AJK	12/7/87
APPROVED	K BURDICK	12/8/87
REL.FOR PROD.	BC	12/8/87

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: TYMP INTERNAL COMPONENT ASSY TEST SPECIFICATION

CODE IDENT. 64475 | D | DRAWING NO. A01785 | REV. D

SCALE FULL | SHEET OF 1

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD. ENG. (CN 4)	5-4085	CFH	3-25-87	
b	REV'D VIEW E-E	11660	MKG	5-6-85	
C	NEEDS NAMED	5-1222	MGS	1731/85	
D	ADDED △8 TO ITEM 9 AND NOTE 18 TO SHEET 2	5-4425	CFH	2-24-87	
E	ADDED △4 AND NOTE 19 TO SHEET 2	5-4283	CFH	2-24-87	
F	ADDED 20 AND NOTE 20 TO SHEET 2	5-4735	CFH	2-25-87	
G	CHANGED LABEL (SERIAL NO.) TO OPPOSITE SIDE OF BATT. COMPT. (ITEM 3) REV'D NOTES SHEET 2	5-4838	CFH	3-25-87	
H	REV'D. NOTES (SEE SH. 2)	5-5019	CFH	4-21-87	
J	ADDED △21 TO DWG. & NOTE 21 TO SHEET 2	5-5247	CFH	6-9-87	
K	REMOVED ITEM 7 AND NOTE 10 (SHEET 2) ALSO ITEM 7 FROM NOTE 16	5-5575	CFH	8-17-87	
L	CHANGED TITLE TO MICROTYMP HANDLE ---	5-17295	CFH	5-31-88	
M	REV'D. ITEM 5 PER DWG. 236011, REMOVED ITEM 4 (BLACK MAX.) REV'D. SHT. 2- DELETED NOTE 9	5-19356	CFH	6-27-89	
N	ADDED ITEMS 25 & 26 (SECT D-D) SHEET 2 ADD NOTE 22	5-20468	CFH	2-13-90	
P	REV'D NOTE 13 SHEET 2	27287	CFH	4-24-91	

THIS SURF. ONLY

MIKE ISOLATION PAD ON ITEM 5

SECT C-C

FLEX CIRCUIT

LABEL (FROM MFG CONTROL CARD) SIDE OF ITEM 5, THIS LOCATION.

NOTE- ENGLISH VERSION SHOWN

2 PLCS

4 PLCS

VIEW E-E

VIEW F-F

SECT B-B

SECT A-A

SECT D-D

2 PLACES

GND

DATA

CTS

CHARGE

WHITE

MATERIAL:	FINISH:	QTY	QTY	QTY	ITEM NO.	PART NUMBER	DESCRIPTION
		504	505	506	507		LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN [ ]. DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING: EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B

NEXT ASSY	QTY	USED ON
	1	23600

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON: BASIC DIMENSION	XX	XXX
UP TO 8	± .02	± .005
ABOVE 8 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGLES = ½ DEGREE

DO NOT SCALE

		DATE
DRAWN	LGK	5/4/85
CHECKED	WAG	5/9/85
APPROVED		5-10-85
REL. FOR PROD.	TG	4/28/85

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: MICROTYMP HANDLE FINAL ASS'Y

CODE IDENT. 88478 | SIZE D | DRAWING NO. 236000 | REV 6

SCALE 2:1 | SHEET 1 OF 2

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REV	REVISION DESCRIPTION	ECN	INIT.	DATE	APPROVAL
H	REV'D. NOTES 3C, 17 AND 19; REDRAWN	5-15019	CFH	4-21-87	
J	ADDED NOTE 21	5-15367	CFH	6-9-87	
K	REMOVED NOTE 10 AND ITEM 7 FROM NOTE 16	5-15575	CFH	8-17-87	
L	CHANGED TITLE TO MICROTYMP HANDLE	5-17295	CFH	5-31-88	
M	REMOVED NOTE 9	5-19[illegible]	CFH	6-27-89	
N	ADDED NOTE 22	5-20268	CFH	2-13-90	
P	REV'D. NOTE 13- 8-16 IN/OZ. WAS 1.0-2.0 IN/LBS.	5-22761	CFH	4-24-91	

NOTES:

1. TEST PER R00847

(1) UNIT SERIAL NUMBER (FROM MFG. CONTROL CARD) APPLIES. THIS LOCATION.

(2) MANUFACTURING CONTROL CARD - THE MFG. CONTROL CARD SHALL BE MARKED IN THE APPROPRIATE LOCATION WITH THE FOLLOWING INFORMATION:

A. DATE OF INSTRUMENT ASSEMBLY.

B. DATE OF FINAL TEST.

WHEN THE INSTRUMENT IS READY TO BE SHIPPED:

A. A LABEL SHOULD BE DETACHED FROM THE MANUFACTURING CONTROL CARD AND APPLIED IN THE APPROPRIATE LOCATION TO THE INSTRUMENT REGISTRATION CARD.

B. THE MFG. CONTROL CARD SHOULD BE DETACHED FROM THE INSTRUMENT.

C. A LABEL SHOULD BE REMOVED FROM THE MFG. CONTROL CARD AND APPLIED TO ONE END OF THE SHIPPING BOX, ADJACENT TO THE PRODUCT IDENTIFICATION LABELS.

D. THE CODE NO. OF THE DISTRIBUTOR TO WHOM THE INSTRUMENT IS BEING SHIPPED SHOULD BE MARKED IN THE APPROPRIATE LOCATION ON THE MFG. CONTROL CARD.

E. THE MFG. CONTROL CARD SHOULD BE FILED.

(3) CHARGE BATTERY 12 HOURS MIN. PRIOR TO SHIPPING.

(4) COLOR MATCH BATTERY COVER (ITEM 6) TO HOUSINGS (ITEMS 14 AND 5).

(5) WIRING HARNESS: YELLOW WIRE CONNECTS TO DATA CONTACT AND WHITE WIRE TO CTS CONTACT AS SHOWN. CHARGE AND GROUND CONTACTS SLIDE ONTO HOUSING BACK (ITEM 14) AS SHOWN. POWER JACK (PART OF ITEM 3) IS INSERTED THROUGH HOLE IN HOUSING AND SECURED WITH DRESS NUT (ITEM 1) AS SHOWN. TIGHTEN (ITEM 1) TO 4 TO 6 IN-LB.

(7) PRIOR TO INSTALLATION, MATING SURFACE TO BE MADE FREE OF CONTAMINANTS USING 70% ISOPROPYL ALCOHOL AND ALLOWED TO DRY THOROUGHLY. PEEL AND DISCARD PROTECTIVE LINER FROM ADHESIVE SIDE(S) OF PAD(S) AND INSTALL AS SHOWN USING FIRM PRESSURE TO ADHERE.

8. THE CONTENTS OF BOTH MEMORIES SHALL BE BLANK WHEN THE INSTRUMENT IS SHIPPED.

(13) PRIOR TO INSTALLING LABEL TO HOUSING, MATING SURFACE MUST BE MADE FREE OF CONTAMINANTS USING 70% ISOPROPYL ALCOHOL AND ALLOWED TO DRY FULLY. LABEL IS TO BE APPLIED FLAT, FULLY WITHIN RECESS WITH NO BUBBLES. CURLED EDGES NOR ANY OTHER TYPES OF DEFORMATION. ORIENTATE LABEL AS SHOWN.

(14) THESE SCREWS TO BE TIGHTENED TO A TORQUE OF 8-16 IN/OZ. (4 PLACES).

(P) (15) ITEM 12 TO BE TIGHTENED TO A TORQUE OF 8-16 IN/OZ.

(16) ITEMS 23 TO BE TIGHTENED TO A TORQUE OF 12-16 IN/OZ.

(17) ITEMS 22 TO BE TIGHTENED TO A TORQUE OF 1.5-2.0 IN/LBS.

(18) PUMP VIBRATION ISOLATION: PURPOSE OF PADS (ITEMS 2, 3, & 8 AND MIKE ISOLATION PAD-SEE SECT. C-C) IS TO ISOLATE PUMP AND MICROPHONE FROM HOUSING WALLS AND OTHER COMPONENTS SO THAT UNWANTED NOISE IS NOT TRANSMITTED TO THE MICROPHONE. THEREFORE, DURING ASSEMBLY, IT SHOULD BE ENSURED THAT NO DIRECT CONTACT IS MADE BETWEEN PUMP OR MICROPHONE AND OTHER COMPONENTS.

(19) PRIOR TO INSTALLATION OF TRANSDUCER PAD (ITEM 24) TO TOP OF TRANSDUCER (PART OF ITEM 5 - SEE SECT. C-C). SURFACE DESIGNATED TO BE MADE FREE OF CONTAMINANTS USING 70% ISOPROPYL ALCOHOL AND ALLOWED TO DRY THOROUGHLY. PEEL AND DISCARD PROTECTIVE LINER FROM 1 ADHESIVE SIDE ONLY OF ITEM 24, AND INSTALL TO TOP OF TRANSDUCER AS SHOWN USING LIGHT PRESSURE.

(20) ITEM 9 SHOULD BE POSITIONED TO INSULATE THE END AND CHARGE CONTACTS.

(21) CLIP BARE ENDS OF TEST LEADS (ITEMS 16, 17, 18 AND 19 838116-501), COVER WITH ELECTRICAL TAPE, AND SECURE LEADS UNDER BATTERY COMPARTMENT.

(22) DATA AND CTS CONTACTS TO BE LOCATED WITHIN .010 OF EACH OTHER WITH RESPECT TO BOTTOM OF BACK HOUSING.

(23) ADHESIVE TAPE MAY BE USED TO RESTRAIN TUBING IN ORDER TO PREVENT PINCHING OR KINKING.

22. USING ITEM 28 BOND TWO OF ITEM 25 TO THE SIDE WALLS OF THE HOUSING AT LOCATIONS SHOWN.

SUPERSEDES DWG. DATED 1-16-86

MATERIAL: ~ FINISH: ~

QTY 504	QTY 505	QTY 506	QTY 507	ITEM SYMBOL	PART NUMBER	DESCRIPTION
						LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSION (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS = CLASS 4
INTERNAL THDS = CLASS 3

GROUP OR PART	NEXT ASS'Y	QTY	USED ON
	APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:

BASIC DIMENSION	XX	XXX
UP TO 6	±.06	±.005
ABOVE 6 TO 24	±.09	±.010
ABOVE 24	±.06	±.015

ANGLES = ± DEGREES

DO NOT SCALE

DRAWN	CFH	4-21-87
CHECKED		
APPROVED		
REL. FOR PROD.		

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: MICROTYMP HANDLE FINAL ASS'Y.

CODE IDENT. 64475 | SIZE D | DRAWING NO. 236000 | REV. P

SCALE ~ | SHEET 2 OF 2

D 236000 P

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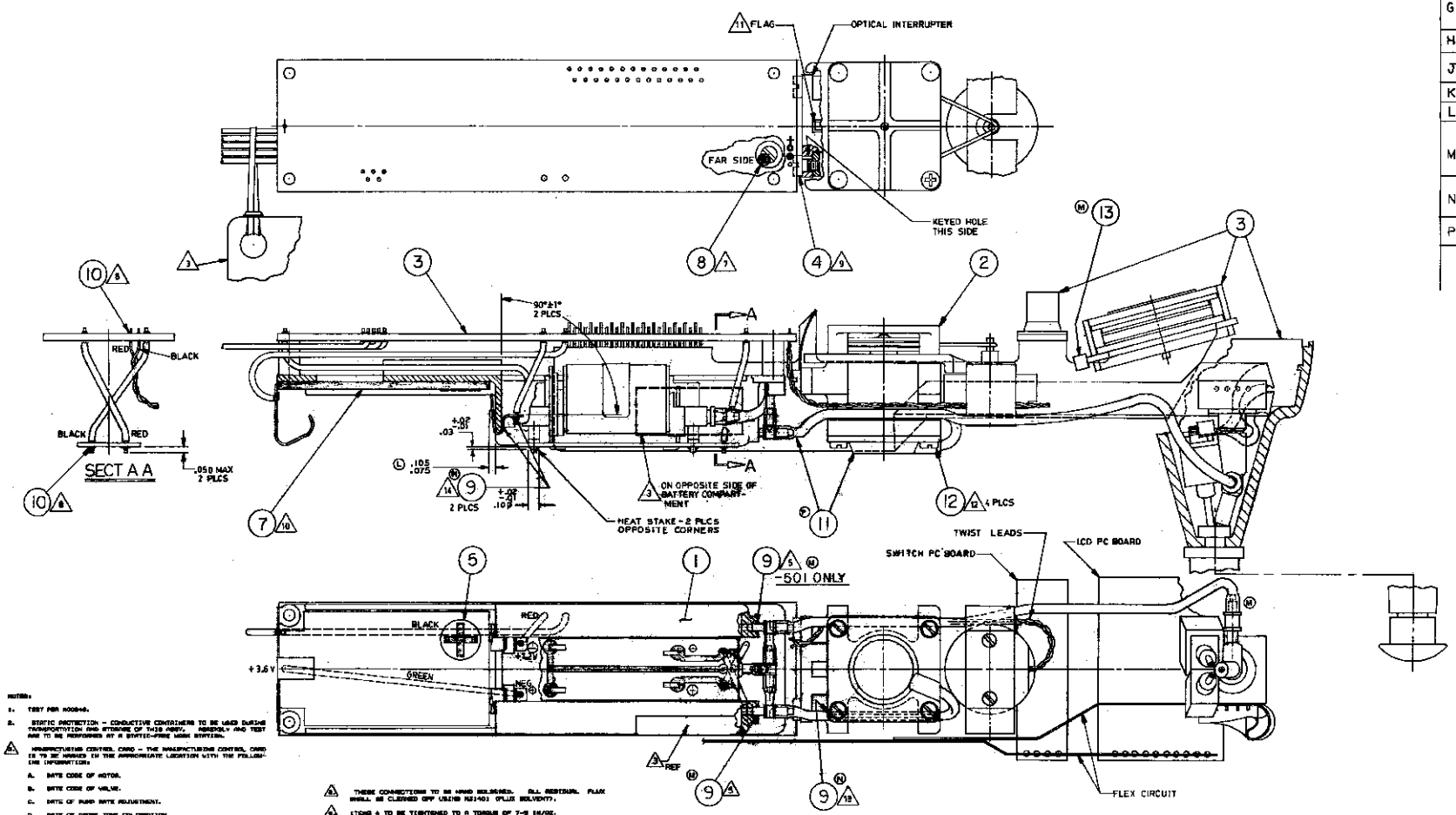
REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
C	REV'D & REDRAWN	12742	MGS	1/31/86	
D	REMOVED ITEM 13 & ADD'D. HEAT STAKE (2 PLCS); ITEM 9 (3 PLCS);	S-14097	CFH	9-26-86	
E	ADDED NOTE 3D, 3E & 3F;	S-14235	CFH	11-4-86	
F	REM'D. NOTE 4 & CALIBRATION LABEL ITEM 1	S-14697	CFH	2-17-87	
G	ADDED ITEM 13. REM'D. R39 FROM TOP VIEW; TUBE ROUTING REV'D. BOT. VIEW REV'D. NOTE 7	S-14725	CFH	2-24-87	
H	REV'D. NOTES 9 & 12 7-9 IN/OZ. WAS 16-24 IN-OZ	S-15008	CFH	4-21-87	
J	REMOVED NOTE 3F. & 4; DELETED ONE ITEM 14; RE-ROUTED 1 TUBE	S-15019	CFH	4-21-87	
K	ADDED NOTE 15 AND ITEM 15	S-15023	CFH	4-22-87	
L	ADDED .105-.075 DIM. TO BATTERY CONTACT	S-16062	CFH	11-4-87	
M	REV'D ITEM 11 PER DWG. 236258; ADDED -502 AND -501 ONLY TO ITEM 9; DELETED ITEMS 5 & 15; NOTE 15; MOVE ITEM 13 PAD TO CORRECT LOCATION	S-19366	CFH	6-26-89	
N	CHANGED ITEM 14 TO 9 & IN NOTES 13 & 14; SHOWN LOCATION OF LABEL (NOTE 3) REF Δ BETTER AND CHANGE NEAR TO OPPOSITE;	S-20775	CFH	3-30-90	
P	REV'D ITEM 11 (TOP CAP RESONATOR ASSY.) PER DWG. 236258 REV. B (BOTTOM VIEW)	S-21946	CFH	10-5-90	



NOTES:

1. TEST PER 800840.
2. STATIC PROTECTION - CONDUCTIVE CONTAINERS TO BE USED DURING TRANSPORTATION AND STORAGE OF 7-438 ASSY., ASSEMBLY AND TEST AND TO BE RESPONSIBILITY OF A STATED-FREE WORK STATION.
3. MANUFACTURING CONTROL CARD - THE MANUFACTURING CONTROL CARD IS TO BE MARKED IN THE APPROPRIATE LOCATION WITH THE FOLLOWING INFORMATION:
   A. DATE CODE OF MOTOR.
   B. DATE CODE OF VALVE.
   C. DATE OF PUMP RATE ADJUSTMENT.
   D. DATE OF PROBE TONE CALIBRATION.
   E. DATE OF COMPLIANCE CALIBRATION.

   A LABEL SHOULD BE DETACHED FROM THE KP'S. CONTROL CARD AND REPLACED AS SHOWN ABOVE. THE SURFACE MUST BE CLEAN PRIOR TO APPLICATION. THERE MUST BE NO FOLDS OR CURLED EDGES ON THE LABEL AFTER APPLICATION.
4. THESE BLUE JOINTS ARE BLUE BRKL. #00855.
5. WARNING - CARE MUST BE TAKEN DURING ASSEMBLY AND TEST TO MINIMIZE BENDING AND STRESS ON THE FLEX CIRCUIT AND CONNECTIONS.
6. A BEAD OF ITEM 6 IS TO BE APPLIED BETWEEN THE ADJUSTMENT SCREW AND BODY PORTION OF ALL ADJUSTED POTS IN ORDER TO LOCK THE ADJUSTMENT IN PLACE AFTER TESTING. AMOUNT USED TO BE MINIMUM FOR EFFECTIVITY, BUT NOT EXCESSIVE SO THAT IT PREVENTS BEING EASILY TURNED BY SCREWDRIVER FOR RE-CALIBRATION.
7. THESE CONNECTIONS TO BE HAND SOLDERED. ALL RESIDUAL FLUX SHALL BE CLEANED OFF USING #21401 (FLUX SOLVENT).
8. ITEMS 4 TO BE TIGHTENED TO A TORQUE OF 7-9 IN/OZ.
9. ITEM 7 TO BE INSTALLED AFTER ALL ADJUSTMENTS.
10. ADHESION FLUX (PART OF ITEM 2) IN CENTER OF OPTICAL INTERRUPTER (PART OF ITEM 2) BEFORE INSTALLING SCREWS 4 AND 12.
11. ITEMS 12 TO BE TIGHTENED TO A TORQUE OF 7-9 IN/OZ.
12. TUBE FROM RESONATOR (PART OF ITEM 11) TO BE FASTENED TO SMOOTH .2M SIDE OF PUMP (PART OF ITEM 2) USING 1 DROP CYANOMELY OF ITEM 9.
13. FINISHED BATTERY CONTACTS (PART OF ITEM 2) TO BATTERY COMPARTMENT (PART OF ITEM 6) BY APPLYING ITEM 9 LIBERALLY TO PREVENT SPRING USING SOLUTION TO MAINTAIN CONDUCTIVITY AS SPECIFIED.

SUPERSEDES DWG. DATED 2/4/85

QTY 504	QTY 503	QTY 502	QTY 501	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
					THIS DWG.-502	" " "
					THIS DWG.-501	INTERNAL COMPONENT ASS'Y

LIST OF MATERIAL

MATERIAL: ~ FINISH: ~

REF. DWGS					
	-501	236000-501	1		
GROUP PART	NEXT ASSY	QTY	USED ON		

APPLICATION

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING: EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .03	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGLES ± 1° DEGREE

DO NOT SCALE

DRAWN	JBK	2/4/86
CHECKED	MWS	2/4/86
APPROVED	CFH	2/4/86
REL. FOR PROD.	TPS	2/4/86

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: INTERNAL COMPONENT ASS'Y

CODE IDENT.	DRAWING NO.	REV
64478	236011	P

SCALE 2:1 SHEET 1 OF 1

236011

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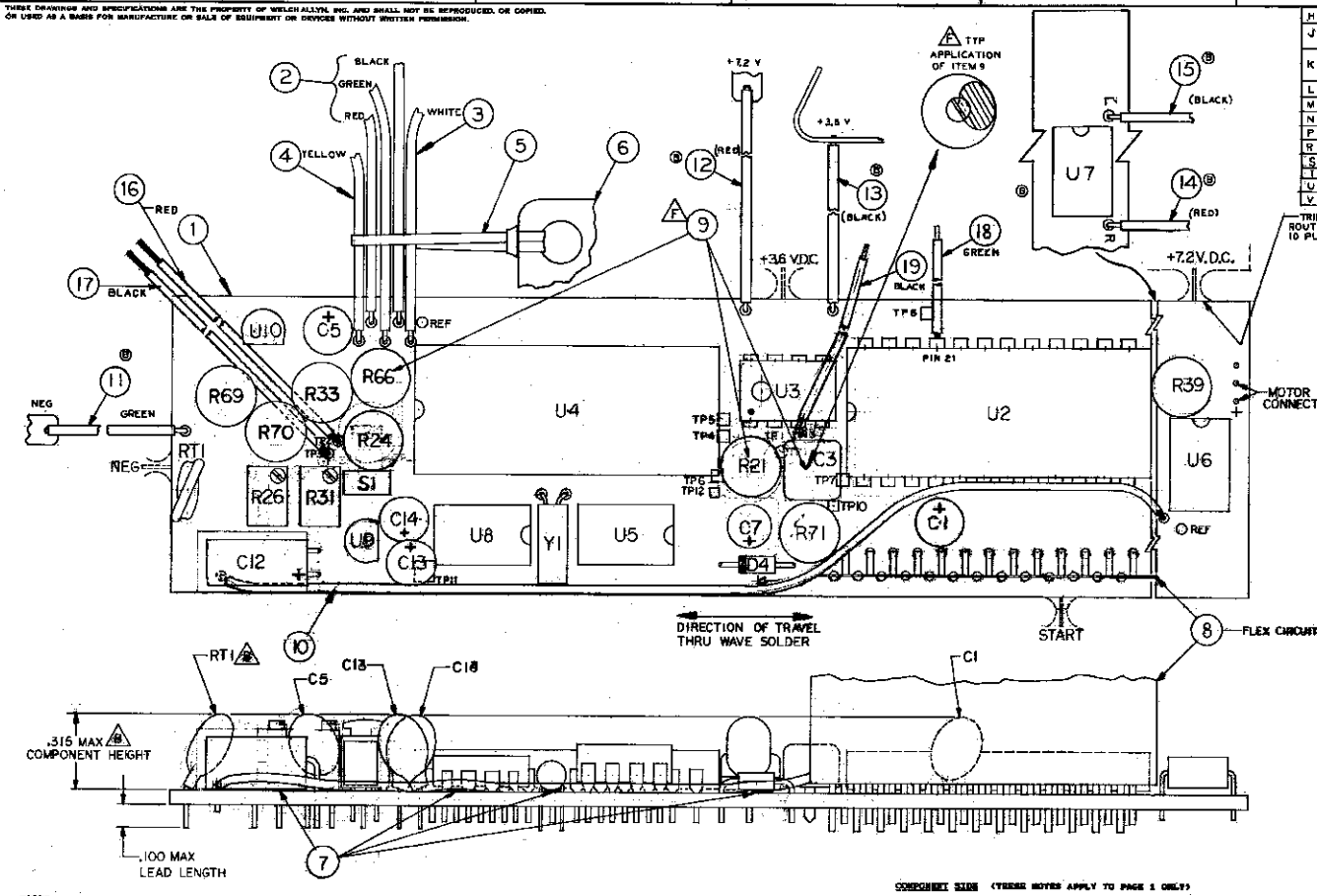

REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD. ENG. (P.S.)	P-12067	GBM	4-29-81	
B	ABOVE ITEMS 11,12,13,14,15, U7 & NOTE 5	P-12067	GBM	2-11-86	
C	SEE SH. 2	13157	MGS	6/13/86	
D	ADDED TO REF HOLES; CHANGED ROUTING OF ITEM 10; -502 TO ARRAY OF 2 VRS 9 (SEE LIST OF MATL)	S-13877	CFH	8-12-86	
E	REV'D. SHEET 2	S-14534	CFH	12-3-86	
F	ADDED ITEMS 16 & 17- RED & BLACK JUMPER WIRES TO TP2 AND TP3	S-14819	CFH	2-3-87	
G	CHANGED C2 TO 236098-3	S-14944	CFH	2-19-87	

REV				
H	REV'D. PART'S 236163 & 236164	14726	CFH	2-24-87
J	ADDED ITEMS 18 & 19 AND REV'D. SHEET 2	S-14743	CFH	2-24-87
K	REV'D. NOTE 3K-60°C FOR 24 HRS WAS 40°C FOR 72; ADDED 45 MIN. EA. HR.; NOTE 5.6.	S-14919	CFH	3-30-87
L	CHANGED 236059	15064	CFH	4-28-87
M	CHANGED 236059	15068	CFH	4-28-87
N	CHANGED A00841	15076	CFH	5-11-87
P	CHANGED A00849	15152	CFH	5-18-87
R	CHANGED A00841	15184	CFH	5-22-87
S	REVD C12 VIEW	15209	MGS	6-3-87
T	REVD 236062	15476	CFH	7-17-87
U	REVD. 236068 PART	16157	CFH	11-20-87
V	CHANGED ITEMS 11 AND 12	16552	CFH	2-5-88

NOTES

GENERAL (THESE NOTES APPLY TO BOTH PAGE 1 & 2)

1. SEQUENCE OF ASSEMBLY -
   - A. SCREEN PRINT OR DOT SOLDER PASTE FOR U1
   - B. PLACE U1
   - C. DRY SOLDER PASTE
   - D. REFLOW SOLDER U1 USING A VAPOR PHASE OR INFRA-RED METHOD.
   - E. TEST PER A00841 (LEVEL 1)
   - F. INSERT LEADED COMPONENTS (INCLUDING ITEMS 2, 3, 4 & 7)
   - G. ATTACH SURFACE-MOUNTED COMPONENTS WITH EPOXY ADHESIVE.
   - H. SOLDER BOTH LEADED AND SURFACE-MOUNTED COMPONENTS USING A DUAL-WAVE SOLDERING METHOD (PRE-HEATING REQUIRED).
   - I. CLEAN RESIDUAL FLUX (AQUEOUS BASE SOLVENT).
   - J. TEST PER A00841 (LEVEL 2).
   - K. BURN IN AT 60 DEG. C FOR 24 HOURS WITH POWER (REG. +3.6V, +7.2V) CONNECTED, TO BE ACTIVATED (START CONNECTED TO RED) AS MIN. EACH HOUR.
   - L. TEST PER A00841 (LEVEL 3).
   - M. BREAK OUT OF ARRAY (-501 ONLY).

2. STATIC PROTECTION

   CONDUCTIVE CONTAINERS TO BE USED DURING TRANSPORTATION AND STORAGE OF THIS ASSEMBLY. ASSEMBLY AND TEST ARE TO BE PERFORMED AT A STATIC-SAFE WORKSTATION.

3. REF. CONTROL CARD

   ITEM 6 (REFG. CONTROL CARD) TO BE ATTACHED TO THIS ASSEMBLY USING ITEM 5 (RUBBER BAND) AFTER STEP L. THE CARD SHALL BE MARKED WITH THE DATE CODES OF U2 AND U4. THE CARD SHALL ALSO BE MARKED WITH THE COMPLETION DATES OF STEP K (BURN-IN), STEP L (FINAL TEST) AND CLOCK RATE CALIBRATION. SEE NOTE 1 FOR STEP DESIGNATORS. THE REV. LEVEL OF THIS ASSY SHALL BE MARKED ADJACENT TO "SD. CHECK".

4. THERMAL SHOCK

   COMPLETED ASSEMBLY TO BE CAPABLE OF WITHSTANDING THERMAL SHOCK TEST WITHOUT DEVIATION FROM A00841 LEVEL 3 SPECIFICATIONS. 0 DEG. C FOR 1 HOUR, 54 DEG. C FOR 1 HOUR REPEATED 25 TIMES.

(B) 5. TERMINATIONS OF LOOSE WIRE LEADS MUST BE PREVENTED FROM CONTACT WITH ANY OTHER ELECTRICAL CONNECTION DURING BURN-IN AND TEST.

COMPONENT SIDE (THESE NOTES APPLY TO PAGE 1 ONLY)

A. ALL COMPONENTS TO BE ASSEMBLED TIGHTLY TO BOARD.

(A) RT1, C1, C5, C7, C13 AND C14 MUST BE MOUNT OVER AS SHOWN TO MEET COMPONENT HEIGHT RESTRICTIONS.

C. SMALL AMOUNT OF ADHESIVE, ITEM 7. MAY ALSO BE USED TO HOLD RADIAL-LEADED CAPACITORS IN PLACE DURING WAVE-SOLDERING, PROVIDED CIRCUIT FUNCTION IS NOT COMPROMISED.

D. LEADED COMPONENT CONFIGURATION WAS BUT INTENDED FOR MECHANIZED ASSEMBLY.

(A) THESE CONNECTIONS MAY BE HAND-SOLDERED FOLLOWING STEP H PROVIDED THAT ALL RESIDUAL FLUX IS CLEANED OFF.

(A) A BEAD OF CAPTON CEMENT, ITEM 9, IS TO BE APPLIED BETWEEN THE SCREW AND BODY PORTIONS IN ORDER TO -LOCK THESE ADJUSTMENTS IN PLACE FOLLOWING TESTING (NOTE 1 STEP L). THE AMOUNT USED IS TO BE ADEQUATE FOR STABILIZATION, BUT ALSO TO BE EASILY BREAKABLE BY SCREWDRIVER FOR RE-CALIBRATION.

G. REVISION LEVEL OF THE ASS'Y. TO BE MARKED ON LARGE BOARD ASS'Y.

	QTY	QTY	QTY	QTY	ITEM SYMBOL
	004	003	002	001	
THIS DWG - 502					HANDLE PCB ASSY-ARRAY OF 2 SETS OF BOARDS
THIS DWG - 501					SINGLE SET OF 5 BOARDS CUT OUT OF ARRAY
PART NUMBER					DESCRIPTION

LIST OF MATERIAL

MATERIAL: FINISH:

UNLESS OTHERWISE SPECIFIED: METRIC DIMENSION (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING: EXTERNAL THDS = CLASS 2 A, INTERNAL THDS = CLASS 2 B

NEXT ASS'Y	QTY	USED ON
APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .05	± .005
ABOVE 6 TO 24	± .05	± .010
ABOVE 24	± .05	± .015

ANGLES: ± ½ DEGREE

DO NOT SCALE

	NAME	DATE
DRAWN	JDK	6/25/84
CHECKED		7/1/85
APPROVED		7-11-85
REL. FOR PROD.		7-11-85

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE PCB ASSY COMPONENT SIDE

CODE IDENT.	DRAWING NO.	REV.
64478	236116	G

SCALE 4:1 SHEET 1 OF 2

236116 G

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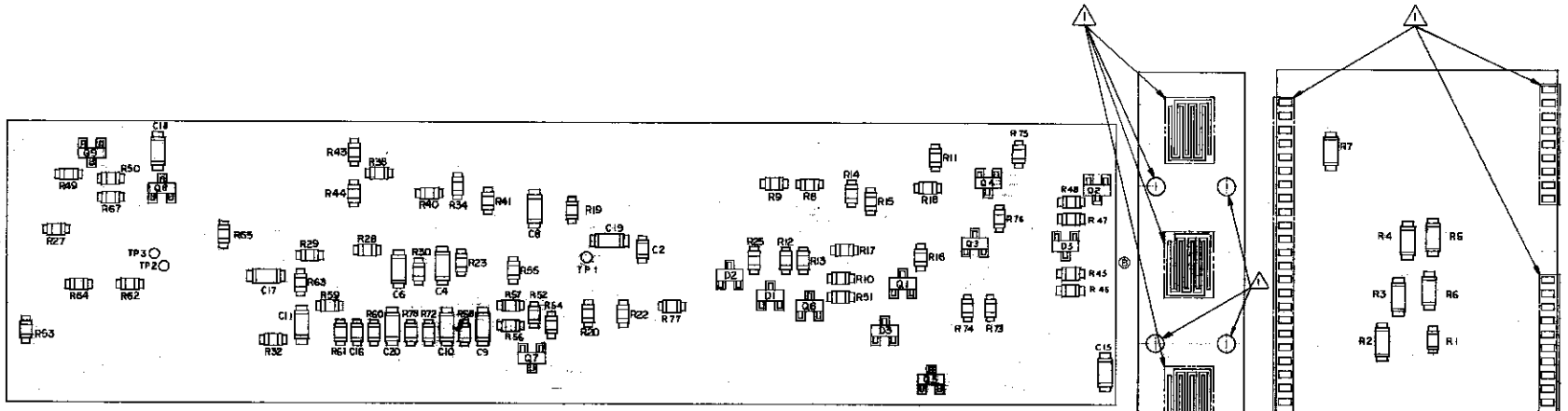
REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD. ENG. (PE)		CBM	4-21-85	
B	ADD'D Q3, Q4, R73, R74, R75, R76; CHG'D PATTERN OF SWITCH	S-12517	CBM	2-11-86	
C	ADD'D R77	S-13552	MGS	6/13/86	
E	REMOVED R42, 37, 35, 36, & 68; ADD'D. R78; TURNED R58, 72 & R60 90°;	S-14374	CFH	12-3-86	
J	ADDED SOLDERMASK TO THRU HOLES ON SWITCH BOARD	S-14743	CFH	2-25-87	



NOTES:

SOLDER SIDE (THESE NOTES APPLY TO SHEET 2 ONLY)

⚠ THESE AREAS TO BE MASKED DURING SOLDERING TO PREVENT SOLDER BUILD-UP. MASKING MATERIAL TO BE REMOVED AT THE COMPLETION OF ASSEMBLY. THESE SHALL BE NO RESIDUAL FILM FROM MASKING WHICH WOULD INHIBIT ELECTRICAL CONNECTION TO PADS.

QTY 804	QTY 803	QTY 802	QTY 801	ITEM SYMBOL	PART NUMBER	DESCRIPTION
					THIS DWG-501	HANDLE PCB ASS'Y

LIST OF MATERIAL

MATERIAL: ~ FINISH: ~

REF. DWGS

UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSION (WHEN USED) ARE IN [ ].
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS — CLASS 2 A
INTERNAL THDS — CLASS 2 B

GROUP OR PART	NEXT ASSY	QTY	USED ON
	236065-501	1	
	APPLICATION		

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .01	± .005
ABOVE 6 TO 24	± .02	± .010
ABOVE 24	± .05	± .015

ANGLES ± ½ DEGREE

DO NOT SCALE

DRAWN JDK 4/9/85
CHECKED DKW 4/10/85
APPROVED DKW 4-11-85
REL. ENG. APPROVED 5-1-85

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE PCB ASS'Y SOLDER SIDE

CODE IDENT. 84478 | SIZE D | DRAWING NO. 23616 | REV. J

SCALE 4:1 | SHEET 2 OF 2

23616

D 236220 Y

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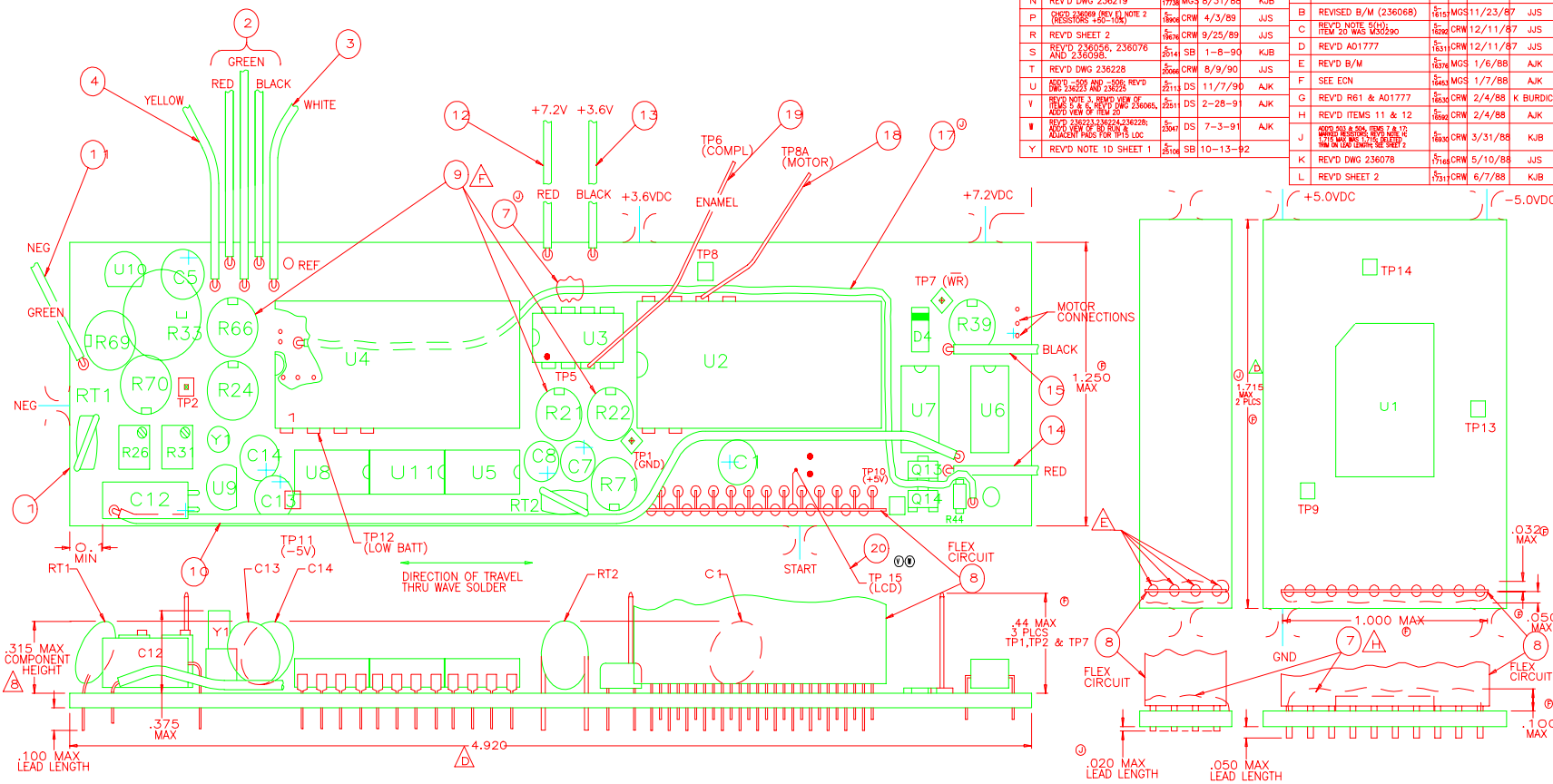
M	REV'D A01837	C-17409	CRW	7/7/88	JJS
N	REV'D DWG 236219	C-17738	MGS	8/31/88	KJB
P	CHG'D 236069 (REV F) NOTE 2 (RESISTORS +50-10%)	C-18906	CRW	4/3/89	JJS
R	REV'D SHEET 2	C-19676	CRW	9/25/89	JJS
S	REV'D 236056, 236076 AND 236098.	C-20141	SB	1-8-90	KJB
T	REV'D DWG 236228	C-20066	CRW	8/9/90	JJS
U	ADD'D -505 AND -506; REV'D DWG 236223 AND 236225	C-21112	DS	11/7/90	AJK
V	REVISED NOTE 1, REVD VIEW OF ITEMS 5, 6 & 8; REVD DWG 236065, ADD'D VIEW OF ITEM 20	C-22251	DS	2-28-91	AJK
W	REV'D 236224,236224,236228; ADD'D VIEW OF BD ROW & ADJACENT PADS FOR TP15 LOC	C-23047	DS	7-3-91	AJK
Y	REV'D NOTE 1D SHEET 1	C-25106	SB	10-13-92	

REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD. ENG.	C-15868	MJP	9-30-87	K.BURDICK
B	REVISED B/M (236068)	C-16151	MGS	11/23/87	JJS
C	REV'D NOTE 5(D) ITEM 20 WAS M3029O	C-16290	CRW	12/11/87	JJS
D	REV'D A01777	C-16311	CRW	12/11/87	JJS
E	REV'D B/M	C-16376	MGS	1/6/88	AJK
F	SEE ECN	C-16461	MGS	1/7/88	AJK
G	REV'D R61 & A01777	C-16530	CRW	2/4/88	K BURDICK
H	REV'D ITEMS 11 & 12	C-16590	CRW	2/4/88	AJK
J	ADD'D 503 & 504; ITEMS 7 & 17; MARKED RESISTORS; REV'D NOTE 'C' 1.715 MAX DIM. (.715 DELETED) TRIM ON 1.040 LENGTH; SEE SHEET 2	C-16930	CRW	3/31/88	KJB
K	REV'D DWG 236078	C-17168	CRW	5/10/88	JJS
L	REV'D SHEET 2	C-17311	CRW	6/7/88	KJB



NOTES:

(F) 1. GENERAL

A. TEST PER A01777 (LEVEL 2) BEFORE BURN-IN

B. BURN-IN AT 60°C FOR 24 HOURS WITH POWER (NEG +3.6V, +7.2V) CONNECTED, TO BE ACTIVATED (START CONNECTED TO NEG) 45 MIN EACH HOUR.

C. TEST PER A01777 (LEVEL 3)

(Y) D. BREAK OUT OF ARRAY REMOVE PROTRUDING MATERIAL PER DIM'S △ MAX UNDERCUT .002

(F) 2. STATIC AND MECHANICAL PROTECTION

STATIC PROTECTIVE CONTAINERS TO BE USED DURING TRANSPORTATION AND STORAGE OF THIS ASSEMBLY. ASSEMBLY AND TEST TO BE PERFORMED AT A STATIC-SAFE WORK STATION. CONTAINERS MUST PREVENT MECHANICAL DAMAGE, I.E., FLEX BREAKAGE.

(V)(F) 3. MFG CONTROL CARD

MFG CONTROL CARD TO ACCOMPANY THIS ASSEMBLY. THE CARD SHALL BE MARKED WITH THE DATE CODE OF U2 AND U4. THE CARD SHALL ALSO BE MARKED WITH THE COMPLETION DATES OF NOTE 1F BURN-IN FINAL TEST AND CLOCK RATE CALIBRATION. SEE NOTE 4F FOR STEP DESIGNATORS. THE REV LEVEL OF THIS ASSY SHALL BE MARKED ADJACENT TO "BD CHECK". SERIALIZATION TO BE SEQUENTIAL WRT TIME ASSY BUILT.

(F) 4. THERMAL SHOCK

COMPLETED ASSEMBLY TO BE CAPABLE OF WITHSTANDING THERMAL SHOCK TEST WITHOUT DEVIATION FROM A01777 LEVEL 3 SPECIFICATIONS. 0°C FOR 1 HOUR, +45°C FOR 1 HOUR, REPEATED 25 TIMES. MAX. TRANSITION TIME 10 MIN.

(F) 5. TERMINATIONS OF LOOSE WIRE LEADS MUST BE PREVENTED FROM CONTACT WITH ANY OTHER ELECTRICAL CONNECTION WHILE ASS'Y POWERED.

COMPONENT SIDE (THESE NOTES APPLY TO PAGE 1 ONLY)

A. ALL COMPONENTS TO BE ASSEMBLED TIGHTLY TO BOARD

(F) B. RT1,C1,C5,C7,C8,C13 & C14 MUST BE BENT OVER AS SHOWN TO MEET COMPONENT HEIGHT RESTRICTIONS

C. SMALL AMOUNT OF ADHESIVE, ITEM 7, MAY ALSO BE USED TO HOLD RADIAL LEADED CAPACITORS IN PLACE DURING WAVE SOLDERING, PROVIDED CIRCUIT FUNCTION IS NOT COMPROMISED

D. LEADED COMPONENT CONFIGURATION WAS NOT INTENDED FOR MECHANIZED ASSEMBLY

(F) E. THESE CONNECTIONS MAY BE HAND-SOLDERED

(F) F. A BEAD OF GLYPTOL CEMENT, ITEM 9, IS TO BE APPLIED BETWEEN THE SCREW AND BODY PORTIONS IN ORDER TO LOCK THESE ADJUSTMENTS IN PLACE FOLLOWING TESTING. THE AMOUNT USED IS TO BE ADEQUATE FOR STABILIZATION, BUT ALSO TO BE EASILY BREAKABLE BY SCREWDRIVER FOR RE-CALIBRATION.

(F) G. REVISION LEVEL OF THE ASSY TO BE MARKED ON TOP SIDE OF U4. (WATER RESISTANT)

(J)(F)(G) H. APPLY 0.1 BEAD OF ITEM #7 ALONG ITEM #8 AS INDICATED FOR STRAIN RELIEF PER DIM'S.

(F) 6. HIGH IMPEDANCE CIRCUITRY REQUIRES WELL CLEANED BOARDS. SURFACE LEAKAGE RESISTANCE MUST BE GREATER THAN 6 X 10^10 OHMS AT 90% RELATIVE HUMIDITY. BOARD MUST BE THOROUGHLY CLEANED AFTER MACHINE SOLDERING. HAND SOLDERING ON INPUT/OUTPUT WIRES USING MILD ROSIN FLUX NEED NOT BE CLEANED. ALL OTHER HAND SOLDERING REQUIRES CLEANING BY MACHINE. ANY HAND CLEANING (FLUX BRUSHLETS) MUST BE FOLLOWED BY MACHINE CLEANING

(U)	THIS DWG-506	HANDLE PCB ASSY ARRAY OF 2 SETS OF BOARDS – U REVISION AND ABOVE
(U)	THIS DWG-505	HANDLE PCB ASSY SINGLE SET OF 3 BOARDS CUT OUT OF ARRAY – U REVISION AND ABOVE
(J)	THIS DWG-504	HANDLE PCB ASSY ARRAY OF 2 SETS OF BOARDS
(J)	THIS DWG-503	HANDLE PCB ASSY SINGLE SET OF 3 BOARDS CUT OUT OF ARRAY
	THIS DWG-502	HANDLE PCB ASSY ARRAY OF 2 SETS OF BOARDS
	THIS DWG-501	HANDLE PCB ASSY SINGLE SET OF 3 BOARDS CUT OUT OF ARRAY

PART NUMBER	DESCRIPTION

LIST OF MATERIAL

QTY 504	QTY 503	QTY 502	QTY 501	ITEM OR SYMBOL

MATERIAL: FINISH:

REF. DWGS

UNLESS OTHERWISE SPECIFIED:

METRIC DIMENSIONS (WHEN USED) ARE IN ( ). DIMENSIONS INCLUDE PLATING. REMOVE BURRS & SHARP EDGES. THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:

EXTERNAL THDS = CLASS-2 A
INTERNAL THDS = CLASS-2 B

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		
TOLERANCES ON:		
BASIC DIMENSION	.XX	.XXX
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015
ANGLES: ± 1/2 DEGREE		

DO NOT SCALE

GROUP OR PART	NEXT ASSY	QTY	USED ON
APPLICATION			

DRAWN	MJP	8-19-87
CHECKED	K.BURDICK	9/30/87
APPROVED	JJS	9/30/87
REL.FOR PROD.	BC	9/30/87

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE PCB ASSY COMPONENT SIDE

CODE IDENT.	DRAWING NO.	REV.
64475	D 236220	Y

SCALE 4:1 SHEET OF 2

D 236220 R

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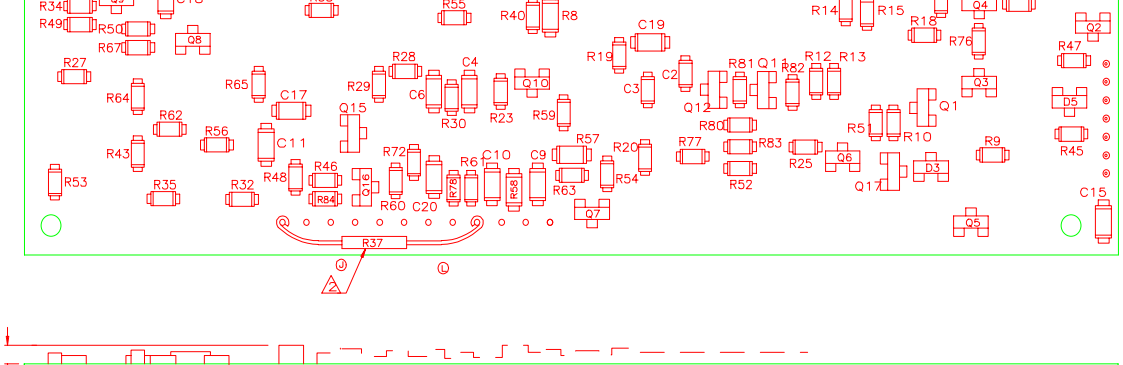
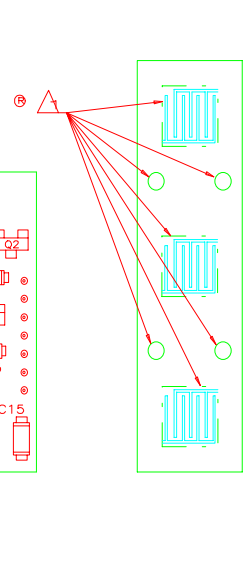
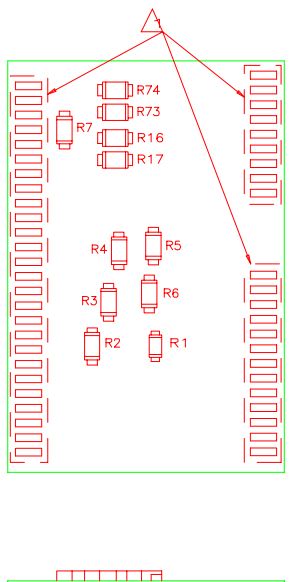
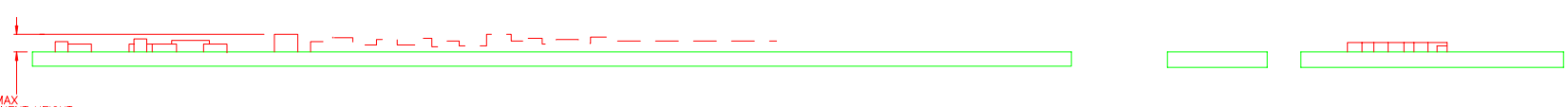
REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASE TO PROD ENG	11885	MJP	9-7-87	K BURDICK
J	ADD'D R37 & NOTE 2; DELETED ITEM 17	S-10932	CRW	3/31/88	KJB
L	CHG'D VIEW OF U2	S-11117	CRW	6/7/88	KJB
R	DELETED ARROWS FROM 1 TO MOTOR CONNECTIONS	S-11967	CRW	9/25/89	









.075 MAX
COMPONENT HEIGHT

NOTES:

SOLDER SIDE (THESE NOTES APPLY TO SHEET 2 ONLY

1. THESE AREAS TO BE MASKED DURING SOLDERING TO PREVENT SOLDER BUILD-UP. MASKING MATERIAL TO BE REMOVED AT THE COMPLETION OF ASSEMBLY. THERE SHALL BE NO RESIDUAL FILM FROM MASKING WHICH COULD INHIBIT ELECTRICAL CONNECTION TO PADS

(J) 2. R37 ATTACHED TO PINS 16 & 24 OF U4. MUST NOT EXTEND PAST EDGE OF BOARD.

MATERIAL: FINISH:

REF. DWGS

UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSIONS (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS = CLASS-2 A
INTERNAL THDS = CLASS-2 B

GROUP OR PART	NEXT ASS'Y	QTY	USED ON

APPLICATION

QTY 504	QTY 503	QTY 502	QTY 501	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION

LIST OF MATERIAL

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

ANGLES: ± 1/2 DEGREE
DO NOT SCALE

DRAWN	MJP	8-19-87
CHECKED	K BURDICK	9/30/87
APPROVED	JJS	9/30/87
REL FOR PROD.	BC	9/30/87

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE PCB ASSY
WIRE SIDE

CODE IDENT. 64475 | SIZE D | DRAWING NO. 236220 | REV. R

SCALE 4:1 SHEET 2 OF 2

D 236219 C

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REV	REVISION DESCRIPTION	ECN	INIT	DATE	APPROVAL
A	RELEASED TO PROD. ENG.	S-15064	MGS	9/29/87	JJS
B	REV'D R55, R56, R23, R33 & RT2; ADD'D R37	S-15803	CRW	3/31/88	KJB
C	R23 (47K WAS 82K)	S-17736	MGS	9/1/88	

ANVIL 1000
FILE NAME: 236219C1

WIRING HARNESS
CTS
CHARGE
SWITCHCRAFT 712A
GND
DATA
WHITE
RED
BLACK
GREEN
YELLOW

U4 HI 2340
U3 ADC 0832 CCN
U2 COP 425C
U1 EPSON SED 1502 F
U10 TL 317CLP
U8 ICL 7660 CPA
U9 LM2931 AZ-5.0
U6 L 272 MB

KEY PAD BOARD (-2)
DISPLAY BOARD (-1)
MAIN BOARD (-3)

KNOWLES BL1671
TEKTRONIX 6212A10
TEST PROBE
TO PUMP
MICRO-SWITCH 136PC05G1
FLEX CIRCUIT

TEST/BURN-IN CONTACTS
G1 G2
2 7
3 8
4 4
5 9
+7.2V
+3.6V
NEG
START

BATTERY
7.2V
3.6V
NEG
(6) 1/3 AA, 65mA Hr NICKEL-CADMIUM CELLS
TP1
RT MAYCHEM RBE 085A

TEST/BURN-IN CONTACTS
G1 G2
1 11
6 6
12 10

HIGHEST REF DESIGNATION
C20 Y1
D5 TP14
Q17
R64
RT2
U11

REF. DESIG. NOT USED
D1,D2 TP4
R36
R37
R42
R68
TP3

NOTES:
1. ALL UNMARKED RESISTORS ARE 5%, 1/8W CHIP TYPE.
2. ALL 1% RESISTORS ARE 1/4W CHIP TYPE.
3. ALL POLARIZED CAPACITORS ARE 20%, 16V DIPPED TANTALUM UNLESS OTHERWISE NOTED.
4. ALL UNPOLARIZED CAPACITORS ARE 10%, 25V, X7R CERAMIC CHIP TYPE UNLESS OTHERWISE NOTED.
5. ALL DIODES ARE 1N4148 CHIP TYPE UNLESS OTHERWISE NOTED.
6. VALVE TERMINAL LABELS REFER TO ACTION RESULTING FROM POSITIVE POLARITY APPLIED TO THAT TERMINAL.

POLARITY SHOWN AT MOTOR CAUSES COUNTERCLOCKWISE ROTATION WHEN MOTOR IS VIEWED FROM SHAFT SIDE, AND CONSEQUENT POSITIVE PRESSURE.

NORGREN V90000-0019 LATCHING TYPE REED VALVE
RESET (OPEN)
LATCH (CLOSE)
PUMP
TO TEST PROBE
OPTICAL INTERRUPTER
BEAM INTERRUPTED AT NEGATIVE PRESSURES
BLK MOT RED
CLT835

CHARGE GND CTS DATA
BOTTOM VIEW OF HANDLE

QTY	QTY	QTY	QTY	ITEM OR SYMBOL	PART NUMBER	DESCRIPTION
504	503	502	50			LIST OF MATERIAL

MATERIAL:
FINISH:
REF. DWGS
UNLESS OTHERWISE SPECIFIED:
METRIC DIMENSIONS (WHEN USED) ARE IN ( ).
DIMENSIONS INCLUDE PLATING.
REMOVE BURRS & SHARP EDGES.
THREADS ARE UNIFIED SERIES AND INCLUDE PLATING:
EXTERNAL THDS = CLASS-2 A
INTERNAL THDS = CLASS-2 B

GROUP OR PART	NEXT ASS'Y	QTY	USED ON
APPLICATION			

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON:

BASIC DIMENSION	.XX	.XXX
UP TO 6	± .02	± .005
ABOVE 6 TO 24	± .03	± .010
ABOVE 24	± .06	± .015

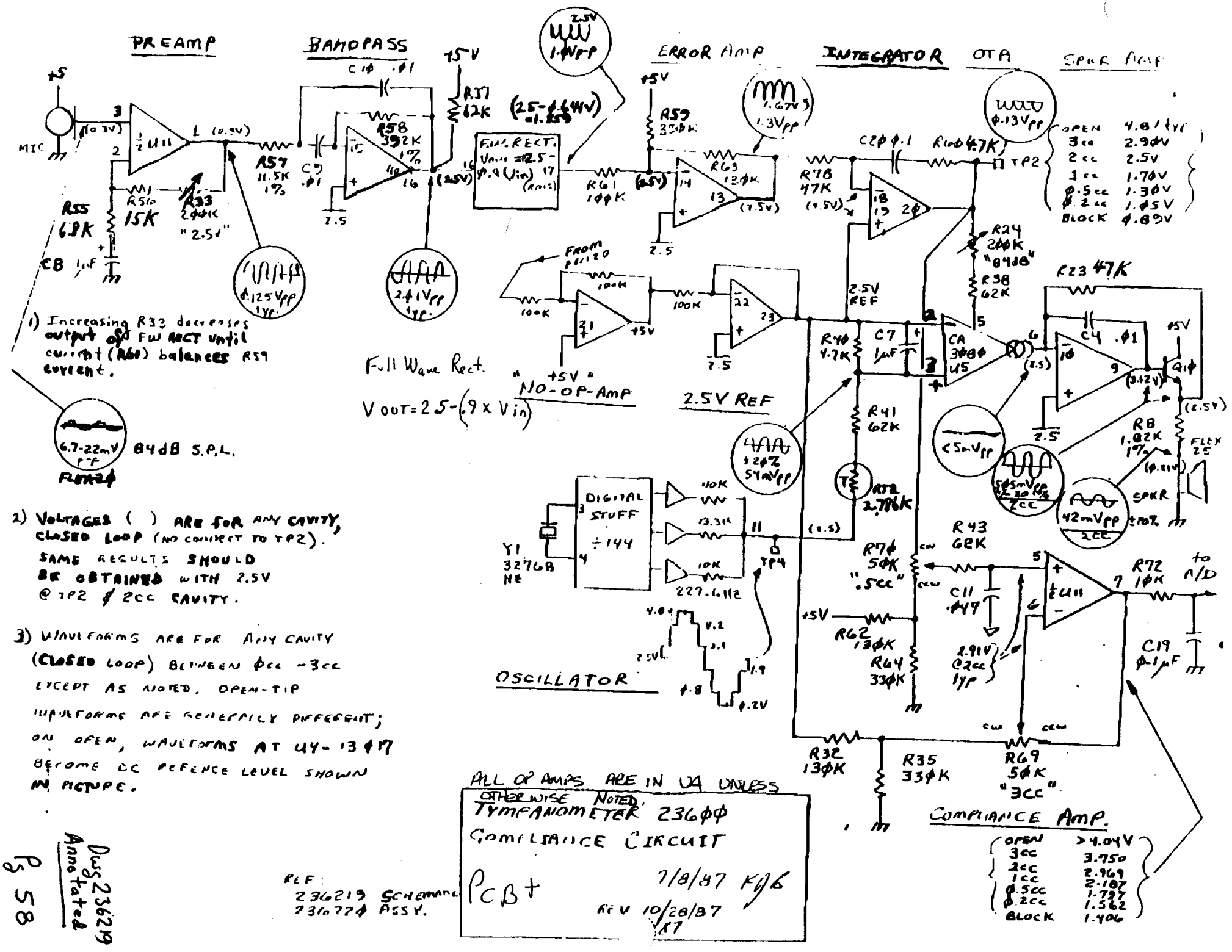
ANGLES: ± 1/2 DEGREE
DO NOT SCALE

DRAWN: M.G. SMITH 8/20/87
CHECKED: CRW/JJS 9/30/87
APPROVED: JJS 10/1/87
REL.FOR PROD.: RDS 10/1/87

WELCH ALLYN, INC.
SKANEATELES FALLS, N.Y. U.S.A.

TITLE: HANDLE SCHEMATIC

CODE IDENT. 64475
D
DRAWING NO. 236219
REV. C
SCALE NONE
SHEET OF 1


PREAMP
BANDPASS
ERROR AMP
INTEGRATOR
OTA
SPKR AMP
+5
MIC
R55 6.9K
CB 1μF
R57 11.5K 1%
C9 .01
R58 392K 1%
R59 33.0K
R60 47K
R61 100K
R62 13.0K
R63 12.0K
R64 33.0K
R24 20.0K "8408"
R38 62K
R23 47K
R40 4.7K
C7 1μF
CA 3080 45
C4 .01
Q1
R41 62K
RT2 2.74K
R43 68K
R70 50K ".5cc"
C11 .047
R72 10K
C19 .1μF
R32 13.0K
R35 33.0K
RG9 50K "3cc"
R8 1.82K 1%
FLEX 25
SPKR
2.5V REF
FROM pin 20
+5V "NO-OP-AMP"
DIGITAL STUFF ÷144
Y1 32768 Hz
TP2
TP4
OSCILLATOR
COMPLIANCE AMP.
OPEN 4.81 Vdc
3cc 2.90V
2cc 2.51V
1cc 1.70V
.5cc 1.30V
.2cc 1.05V
BLOCK .89V
OPEN >4.04V
3cc 3.750
2cc 2.969
1cc 2.187
.5cc 1.737
.2cc 1.562
BLOCK 1.406
FULL RECT.
Full Wave Rect.
VOUT = 2.5 - (.9 x Vin)
6.7-22mV p-p
84dB S.P.L.
FLUTE
1) Increasing R33 decreases output of FW RECT until current (R60) balances R59 current.
1) VOLTAGES ( ) ARE FOR ANY CAVITY, CLOSED LOOP (NO CONNECT TO TP2). SAME RESULTS SHOULD BE OBTAINED WITH 2.5V @ TP2 of 2cc CAVITY.
3) WAVEFORMS ARE FOR ANY CAVITY (CLOSED LOOP) BETWEEN .2cc -3cc EXCEPT AS NOTED. OPEN-TIP WAVEFORMS ARE GENERALLY DIFFERENT; ON OPEN, WAVEFORMS AT U4-13 & 17 BECOME DC REFENCE LEVEL SHOWN IN PICTURE.
ALL OP AMPS ARE IN U4 UNLESS OTHERWISE NOTED.
TYMPANOMETER 2360
COMPLIANCE CIRCUIT
PCB+ 7/8/87 KJG
REV 10/28/87 KJ
REF: 236219 SCHEMATIC 2360720 ASSY.
Dwg 236219 Annotated
pg 58